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ABSTRACT

Papers in this volume include: "The Role of Tone in Some Cushitic Languages" (David L. Appleyard); "Downdrift in a Tone Language with Four Tone Levels" (G. N. Clements); "Non-Pitch Exponents of Accent and Structure in Japanese" (John Coleman); "Clause Structure and Tone in Sandawe" (Edward D. Elderkin); "Tone and Accent in the Qafar Noun" (R. J. Hayward); "Glides and Phonological Change in Mombasan Swahili" (John Kelly); Tone Spacing" (Ian Maddieson); "A Performance of a Swahili Poem Analysed" (Joan Maw); "Pitch, Loudness, and Turn Regulation in Akan Conversation" (Samuel Gyasi Obeng); "Pharyngeal Fricatives, and Pike's 'Fricative' and 'Frictional' Categories" (R. K. Sprigg); "A Study of Quantity in Mestreechs" (L. van Buuren); and "Professor Jack Carnochan: Biographical Note" (G. Furniss and P. J. Jaggar). (MSE)

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York Papers In Linguistics

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Editors

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Grammatical Phonetics

Studies in Honour of Jack Carnochan

DEPARTMENT OF LANGUAGE AND LINGUISTIC SCIENCE
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Professor Jack Carnochan

We have both known Jack Carnochan for over twenty-five years: and the acquaintance has been for us an unmixed pleasure. This is the first thing to be said. Then we must go on to acknowledge the profit that we have derived from knowing him. He was, and still is, an outstanding teacher, committed to the total well-being of his students, approachable, endlessly patient, and possessed of a deep and intuitive good sense whenever and wherever matters of language description and language use are under debate. These self-same qualities he brought to his duties as a Head of Department and to his activities as a senior member of the linguistic community in Great Britain. In West Africa and the Middle East, too, and for the same reasons, his name is held in respect.

For all this, and for his unfailing ebullience and good humour, even in times of crisis, we and the other contributors to this volume are happy and privileged to salute him on this, the occasion of his seventy-second birthday.

JK

JM.

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THE RÔLE OF TONE IN SOME CUSHITIC LANGUAGES

David L. Appleyard

1 Introduction

It has for some time been recognised that tone plays a significant rôle in many Cushitic languages[1], yet because of the at times subtle nature of Cushitic tonal marking it has often been ignored in earlier work and even today is sometimes relegated to a few dismissive and apologetic lines, particularly in preliminary descriptions of languages. The reasons for this may be many, but by way of defence it has to be conceded that it is not always at first sight clear how tone and accent operate in individual Cushitic languages. Indeed, it is to

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[1] It will perhaps not be remiss to clarify from the beginning that I apply the term 'Cushitic' here only to what may be called the nuclear, or orthodox Cushitic languages as now generally accepted by the majority of scholars working in the field. For the purposes of this discussion I have restricted myself to the following languages and language groups: Beja [which alone forms the branch of North Cushitic — there is some dissent as to whether Beja should be included within the Cushitic family], Agaw [also called Central Cushitic], and East Cushitic [further divided principally into Lowland East Cushitic (LEC) which includes the languages of whose accentual systems we have the best descriptions: Afar, Oromo, Somali, etc., Highland East Cushitic (HEC) and Dullay (formerly also called Werizoid). I have excluded so-called Southern Cushitic, the precise status of which is essentially still unclear, and Omotic, which is certainly to be distinguished from 'nuclear' Cushitic, most probably as a separate language family within Afroasiatic.

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some extent incorrect to speak of Cushitic languages as 'tone languages', at least in the sense that is generally understood. In most Cushitic languages, for instance, tone seems to operate in concert with stress in such a way that it might not at first seem apparent that one is dealing with a tonal system at all, but rather with a stress-based accentual system. It is, none the less, only comparatively recently that scholars have been able to provide an adequate analysis of tone and accent in Somali, by far and away the best described of all Cushitic languages and one major language where the tonal nature of the accent is particularly clear.

It is probably true, therefore, to say that most, if not all Cushitic languages can be identified as tonal accent languages, typically with a simple High - Non-high contrast on short vowels plus in addition the possibility of a High-fall tone on long vowels. Although it is not the intention here to provide an analysis of the nature of tone in Cushitic, as this has indeed already been done for a number of languages[2], it will be relevant for the understanding of the examples provided if a few words are said about the analysis of syllables. Thus, in most of the languages cited here the three-term realisation of the tonal accent on long vowels (Non-high VV, High V́V, High-fall V̀V) can be directly related to the two-term system on short vowels (Non-high V, High V́) by counting the moræ: a double mora with a High on the first mora /V́V/ is realised as a high-falling tone, [V̀V]; a double mora with a High on the second mora /VV́/ is realised as a level (or slightly rising) tone, [V́V][3]. In many languages stress is also associated with High tone, and some languages seem to show signs of moving towards a system of straightforward stress accent. Unlike in a number of other African languages, tone in Cushitic hardly ever serves to distinguish lexical items, but is closely bound up with the morpohology, playing a significant rôle in both noun and verb morphology. In Beja, for instance, many morphological formatives have an associated accent, although as in simple instances each word unit may have only one accent, within the morpheme-chain these are generally suppressed in favour of the 'dominant' accent[4]. In a small number of cases, accent alone has a morphological function, as in the possessive pronoun suffixes, 1.sg. /`/, 3.sg. /´/[5]: /ʔi-gaw-uu-`/ [ʔigáwuu] 'my house', /ʔi-gaw-uu-´/ [ʔigawúu] 'his house'. Similarly, tone plays a rôle in plural marking in nouns, often alongside vowel length: [bikkáar] 'hut', [bíkkar] 'huts'; [doobáat] 'bride', [dóobaat] 'brides'; [kàam] 'camel', [kám] 'camels'; [déet] 'mother', [dèet] 'mothers'. In Somali, too, accent alone (High v. Non-high) frequently figures as a morphemic device, as in the often cited minimal pair:[6]

---

[2] Thus for Beja, Hudson 1973 and 1976, pp. 100–102; for Afar, Parker and Hayward 1985, pp. 218–222; for Oromo (Booran), Owens 1980; for Somali, Hyman 1981, to cite but a few.

[3] In the examples that follow I shall maintain the three-term system of marking, rather than the strictly more phonemic one.

(1)

nín bàa	libàax	diléy
man EMPH	lion	he-killed[RESTR]

'*a man* killed a lion / it was a man who killed a lion'

(2)

nín bàa	libaax	diley
man EMPH	lion[SUBJ]	he-killed[EXT]

'a lion killed *a man* / it was a man that a lion killed'

Where in (1) libàax is marked as a non-subject, and the verb diléy is in the so-called restrictive form in agreement with the emphasised, or focalised NP nín bàa, which here is the subject; in (2) libaax, on the other hand, is marked as subject, and the verb diley is in the extensive form agreeing with it, whilst the focalised NP nín bàa is here the object. It is also possible to find such contrasting phrases in other languages, where tone plays a major part, as, for example, in Oromo (Booran dialect):

---

[4] Hudson 1976, pp. 101–2.

[5] The accentual system of Beja is complex and requires a distinction to be made between the underlying forms, which show the clear morphological rôle of the accent, and the surface forms, which at first sight may seem bewildering. See Hudson, op. cit.

[6] In the examples that follow, the official orthography is used in Standard Somali and Afar examples, whilst elsewhere the usual transcription system is used as adopted by most linguists in the field. For Somali, the only symbols that need noting are c (= ʕ), x (= ħ), dh (=d'); in Afar q (= ʕ), c (= ħ), x (=d').

(3)

inní	afáan	booráná	hin	bèex^{u}
he[SUBJ]	language	booran[GEN]	NEG	he-knows[NEG]

'he doesn't know the Booran language'

(4)

inní	afáan	booráná	hín	bèex^{a}
he[SUBJ]	language	booran[GEN]	PRED	he-knows[AFF]

'he knows the Booran language'

Where in (3) the particle hin is the negative marker followed by the negative imperfect tense of the verb, but in (4) hín is the emphatic, predicative particle used with the affirmative imperfect tense. In this case, the verb forms are indeed different, but only minimally so, being distinguished by the quality of the final, voiceless vowels; to that extent, it is the tonal pattern of the verbal complex which may be said to carry the greater contrastive weight. From non-standard Somali (Central dialect) the interesting minimal pair has been recorded: úsə dili 'he killed it' : usə́ dili 'it killed him', where usə is the 3rd masculine pronoun in the Subject and Non-subject forms, respectively. From amongst the HEC languages, where 'stress is phonemic in at least four of the ... languages'[7], examples such as Sidamo t'aʔmí 'he asked' and t'áʔmi 'ask!', or angó 'he has drunk' and ángo 'let us drink' may be cited, though it would appear that such minimal pairs are not the rule. Similarly, it would be possible to go on finding minimal, or near-minimal, pairs of this kind in other Cushitic languages.

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[7] Gragg 1976, p. 248; unfortunately, however, in his descriptive study of these languages Gragg does not continue to mark the accent after making this statement.

In this paper, therefore, the morphological function of tone/accent will be examined in a number of Cushitic languages with a view to seeing if any parallels can be identified between languages and whether any comparative statement can be made that might have validity at group level. This kind of study is necessarily restricted by the fact that full descriptive studies of tone/accent have been carried out only for a small number of Cushitic languages, and we sadly as yet lack in-depth descriptive grammars of a large number of languages. The best described Cushitic language to date is without doubt Somali, chiefly Standard Somali which is based on the Northern Somali dialects. It is perhaps fortunate, therefore, that it appears that it is in Somali that tone plays an especially prominent rôle in the morphology. Interestingly, however, studies of other Somali dialects[8] reveal that whilst tone is generally an important morphological device, the patterns themselves are not always identical with the 'standard' model. This in itself provides us with an initial means into developing some kind of comparative statement about tone/accent in the history of the Somali dialect cluster. Alongside Somali, there are also good grammars of Afar and Oromo (various dialects, but especially the southern dialects including Booran, and Eastern (Harar) Oromo[9], two other major LEC languages, which contain detailed information on the rôle of tone/accent. These three languages, therefore, form the nucleus of this study. However, as they belong to the same sub-family of Cushitic and can thus be expected to have features in common, not least in their employment of tone/accent in their morphological systems, if any kind of wider comparative statement is to be attempted, then other, non-LEC material must be looked at. Beja would be one of the most obvious choices here, having been subjected to sound, if rather concise descriptive analysis including the accentual system. However, in many respects the morphology of Beja is divergent from 'nuclear' Cushitic, particularly in those areas where tone/accent seems to play such an important rôle. A more promising area is Agaw. However, here, too, there are problems; only two Agaw languages (Awngi and Bilin) appear to have a tonal accent system comparable with LEC, whilst the other languages that have been studied in recent years (Kemant and Khamtanga) may have moved, or be moving towards a predictable, syllable-counting stress-based system, perhaps under the influence of Ethiopian Semitic.[10]

---

[8] For a preliminary general discussion of Somali dialectology and the comparison of Somali dialects see Lamberti 1986.

[9] Unfortunately, the most recent descriptions of Western (Wellega) Oromo, the largest and other major dialect area, do not mark tone; see Gragg 1976 and 1982.

The morphological categories which in Somali, for instance, make particular use of tone and which, therefore, may here provide the starting point for examining comparable forms of other Cushitic languages are drawn from the grammar of both nouns and verbs: from nominal morphology, both case marking (especially Subject v. Non-subject, or Absolutive) and gender marking (masculine v. feminine), and from verbal morphology the Jussive, or Optative, and related forms. This, of course, does not mean to say that tone does not play an important rôle in other morphological categories — in Somali the whole question of subordinate verb forms, relative clauses in particular, is closely allied with specific tonal patterns — but for comparative purposes, and allowing for the preliminary nature of this survey, these three basic categories will serve the purpose. It also needs to be said that the morphologies of most Cushitic languages are far from simple, and often require such phenomena as focalisation, NP and VP structure and complexity, and sentence prosody to be taken into account even when analysing such fundamental categories as case marking, for instance. The forms that will be examined here, therefore, may to some extent be abstractions and form only part of the picture. A not uncommon feature of nominal morphology in many LEC languages, for example, is that only one member of a complex NP is marked for case; so, contrast Somali:

---

[10] Indeed, not all LEC languages appear to have maintained the same kind of system seen, for instance, in Somali.

(5)

nin	wùu	i	siiyey
man[SUBJ]	PRED+he	me	he-gave

'a man gave it to me'

(6)

nínkii	wùu	i	siiyey
man+the[SUBJ]	PRED+he	me	he-gave

'the man gave it to me'

(7)

nínkani	wùu	i	siiyey
man+this[SUBJ]	PRED+he	me	he-gave

'this man gave it to me'

(8)

nínkíi	gaadhígíi	watay	wùu	i	siiyey
man+the	car+the	he-drove[SUBJ]	PRED+he	me	he-gave

'the man who drove the car gave it to me'

(9)

nín	iyo	naagi	wày	i	siiyeen
man	and	woman[SUBJ]	PRED+they	me	they-gave

'a man and a woman gave it to me'

where in each sentence only the final constituent of the subject NP is marked for case and thus the noun nin 'man' only appears in the Subject case in (5), although it is the functional subject in all five examples. Similarly, in the following example, though nin is still the underlying subject of the sentence, because it is focalised by the particle bàa it loses its overt marking:

(10)

nín	bàa	i	siiyéy
man	FOC	me	he-gave[RESTR]

'*a man* gave it to me'

2 Case

All of the major Cushitic languages possess a simple case system which differentiates a marked Subject case from an unmarked case, often conventionally called the Non-subject or Absolute case, which amongst other things may function as the direct object of a verb, the nominal predicate, and the object of postpositions, as well as being the citation form of the noun. The marked Subject case is a hallmark of Cushitic, though some languages (including Beja, and both Bilin and Awngi) have restructured this: in Bilin and Awngi it is the object case which is the marked form, for instance, though alone amongst the Agaw languages Kemant preserves traces of the older, typically Cushitic pattern.[11] In addition, many languages show a difference between masculine and feminine nouns in Subject case marking.

In Somali, tone plays a prominent rôle in contrasting the Subject and Absolute cases, in most noun classes being the only mark:

---

[11] See Sasse 1974, and Appleyard 1988, p. 583 and 585.

(11)

ABS	SUBJ	
nín	nin	m. 'man'
tùug	tuug	m. 'thief'
libàax	libaax	m. 'lion'
ínan	inan	m. 'boy'
áabbe	aabbe	m. 'father'
gabdho	gabdho	m. 'girls'
èy	ey	m. 'dog'
náag	naagi	f. 'woman'
hóoyo	hooyo	f. 'mother'
inán	inani	f. 'girl'
éy	eyi	f. 'dogs'

The general rule is that there is lowering of a High tone in both masculine and feminine nouns, while the latter also add the affix -i to consonant-final stems. This same suffix -i also appears on the Subject case form of the demonstrative clitics (cf. nínkani 'this man' in (7), above) alongside a variant -u (nínkanu, náagtanu, náagtani 'this woman'), which in turn also occurs on the non-remote definite clitic (nínku [SUBJ] v. nínka [ABS] 'the man', náagtu [SUBJ] v. náagta [ABS] 'the woman'). In the class of determiners, therefore, the suffix -i/-u is not restricted to the feminine gender.

The situation in other dialects of Somali has not been fully researched, but Saeed's[12] observation that in Central Somali (Af-May) the Subject case is differentiated from the Non-subject by tone alone, involving the lowering of a High tone, would seem to indicate that there, at least, a similar situation obtains as in Standard (Northern) Somali.

Contrasting with the Somali evidence, in Afar only masculine nouns exhibit a separate Subject case, and then only those nouns that are vowel-final in the Absolute form.

---

[12] Saeed 1982, p. 14.

(12)

ABS	SUBJ	
áwka	awkí	m. 'boy'
idáltu	idaltí	m. 'old man'
báxa	baxí	m. 'son'
búuti	buutí	m. 'pot'
núm	núm	m. 'man'
rakúb	rakúb	m. 'camel'
iná	iná	f. 'mother'
awká	awká	f. 'girl'

Subject case marking on nouns in Afar, therefore, consists of accented -í, which replaces the final vowel of vowel-final masculine nouns only.

In Oromo, the form of the Subject case differs slightly from dialect to dialect. Because of its general conservative nature, let us look first at Booran. Here, masculine and feminine nouns are formally distinguished in the Subject case only, -í or -ní being added to masculine nouns according to stem shape, -ni to feminine nouns ending in a long vowel (or, in isolation, a glottalised vowel, and -tí being added to feminine nouns ending in a short vowel.[13]

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[13] So Andrzejewski 1970, p. 93 ff., and Owens 1982, pp. 51-54; Stroomer 1987, p. 167, has forms with a long vowel, -ii and -tii, besides short vowel -ni.

(13)

ABS	SUBJ	
nám^{a}	namí	m. 'man'
nyàač^{a}	nyaačí	m. 'crocodile'
fárd^{a}	fardí	m. 'horse'
sáreʔ	sáréen^{i}	m. 'dog'
hárreʔ	hárréen^{i}	f. 'donkey'
nagàa	nageenní	m. 'peace'
bísaan^{i}	bísaan^{i}	pl. 'water' (no change)
laf^{a}	laftí	f. 'land'
ràad^{a}	raaddí	f. 'heifer'
d'ìir^{a}	d'iirtí	f. 'men'
íntal^{a}	intaltí	f. 'girl'

In other dialects similar forms occur, the major difference from Booran being that the masculine Subject case affix elsewhere generally includes the consonant -n- (Waata, the southernmost Oromo dialect, has -íin on masculine short vowel-final nouns), and in Western (Wellega) and Central (Tulema) dialects the special feminine suffix tends to be replaced by the masculine -n- (Waata, again divergent, has -tíin). As regards accent, the Subject case affix in most dialects would appear to have a High tone (or stress[14]), except perhaps in the Central dialects. Here, however, the available data is not clear on the nature of the accentual system, but certainly Moreno's data differ markedly from the other dialects:[15] cf. námā : námni 'man'; sarê : sarên, sarêni 'dog'; intálā : intálti, intálli (< intál+ni) 'girl'. Cf:

---

[14] Stroomer 1987 consistently speaks of stress in his analysis of the three southern dialects, Booran, Orma, and Waata.

[15] Moreno 1939 goes so far as to say [p. 30] 'l'accento in galla è molto instabile, essendo soggetto a complesse azioni di enclisi e di ritmo e variazioni psicologiche.' The transcription in the following examples is Moreno's.

(14)

	ABS	SUBJ	
Harar	namá	namníi	'man'
	sárée	sáréen	'dog'
	intalá	intaltíi	'girl'
	bišáan	bišáan	'water'
Wellega	nám^{a}	namní	'man'
	sáree	saréen(')	'dog'
	intál^{a}	intaltí, intallí	'girl'
	bisáan(')	bisáan(')	'water'
Waata	nam^{a}	namíin	'man'
	sére	séréen	'dog'
	híntal^{a}	híntaltíin	'girl'
	bisáan'	bisáan	'water'

From all this data we may abstract the following features of Subject case-marking held in common: somewhere in all three languages the vowel -i is involved and this, in Afar and Oromo, is usually marked with High tone. The consonant -n- in the Oromo forms, as well as the special feminine forms in -t-, are usually regarded as an Oromo innovation, though, with respect to the latter forms, it is not unusual in Cushitic for feminine nouns to be marked differently from masculine nouns in the Subject case (cf. Somali). At first sight, Somali seems to be aberrant in that it is only feminine *nouns* which receive -i, but as is evident from the determiner clitics this may be a later development. Indeed, Sasse[16] has shown that the situation which now obtains in Somali (and its close relatives such as Rendille and Dasenech) has developed regularly out of a pattern much more reminiscent of other LEC languages. There seems to have been a general rule in Somali that original (Proto-LEC) short vowels were lost and long vowels shortened. Thus, the final -i on such as naagi derives from an older long vowel, probably from a class of feminine nouns, widespread in other East Cushitic (LEC and HEC) languages, which end in a long vowel -ee (the Genitive case of feminine nouns like náag still ends in -eed: naagéed<*naag-ée-ti). The Subject case naagi, therefore, derives from an older *naag-ii. The presence of -i on what are now consonant-final feminine nouns only may be explained by the conflation of two original classes of nouns. From comparative evidence, it appears that feminine nouns ending in short vowels did not mark the distinction between the Absolute and Subject cases, as is generally still the practice in Afar and in Sidamo, a HEC language. In order to mark the case distinction, then, Sasse suggests that the long-vowel stem pattern was transferred to the other class of feminine nouns. In masculine nouns ending in a short vowel, the loss of that vowel which originally marked the case distinction (Subject case *-í, as still in Afar) left tone as the only indication: *náma > Som. nín; *namí > Som. nin[17]. So, too, *íl(a)ma > Som. ínan; il(a)mí > inan 'boy'. The Somali innovation is in extending Subject case marking to the class of feminine nouns, at the same time applying the newly arising masculine pattern of low tones as well, thus naagi and not *naagí.

---

[16] Sasse 1984, p. 115-116.

Subject case marking in Oromo also shows signs of considerable innovation, incorporating new consonantal markers in conjunction with the old, inherited PLEC *-í. The -n- of Booran sáréen^{i}, etc., as well as Harar namní, besides Booran namí, is probably of demonstrative origin,[18] as the feminine -t- certainly is. The question arises, though, whether Booran namí continues the original LEC directly, or represents a simplification of such as nam-ní, as is found in other dialects. Given the altogether conservative nature of Booran, I would suggest that it does, and that forms such as namní arose out of contamination with the long vowel-final class such as sárée : sáréen(^{i}), etc., where it may be conjectured that the enclisis of -ni was developed in order to differentiate the Subject case from the Absolute where it would have been difficult to add a vocalic ending. The Somali case discussed above, of course, presents a different solution, by substituting the quality of the case marker vowel. Forms such as Oromo nam-ní, sárée-n(') and intal-tí are, therefore, structurally similar to determined forms in Somali, such as nín-ka 'the man', aabbá-ha 'the father', náag-ta 'the woman', gabádh-dha 'the girl', etc.

---

[17] The change of (new) final *-m to -n is well documented in Somali, cf. the reduplicated plural of nín, which is niman. Lamberti (1983, p. 200) suggests that the change of original *a to i is predictable before *m, though it might be said that this root shows wide variation of vocalisation in LEC: Afar num, Oromo nam^{a}.

[18] Sasse 1984 p. 123.

Turning away from LEC, whilst in HEC, for instance, there are formatives involved in Subject case marking that are clearly related to what has been described above, because the available data does not include tone marking, it is not possible to say anything relevant to the study here. Similarly, Beja does not prove to be relevant because although we do have accentually marked data, the system of subject-object cases is quite different. So:

(15)

<table>
<tr><td>/ʔuu-ták</td><td>ʔoo-yàas</td><td>rih-y-à/</td></tr>
<tr><td>|ʔuuták</td><td>ʔóoyaas</td><td>rhíya|</td></tr>
<tr><td>the|SUBJ|+man</td><td>the|OBJ|+dog</td><td>he-saw</td></tr>
</table>

'the man saw the dog'

(16)

<table>
<tr><td>/ʔuu-yàas</td><td>ʔoo-ták</td><td>rih-y-à/</td></tr>
<tr><td>|ʔúuyaas</td><td>ʔooták</td><td>rhíya|</td></tr>
<tr><td>the|SUBJ|+dog</td><td>the|OBJ|+man</td><td>he-saw</td></tr>
</table>

'the dog saw the man'

Case marking is here carried by the preposed article; indefinite masculine nouns ending in a vowel and without any further prominal suffix are also marked in the Object case by a suffixed -b. All this is quite different from the East Cushitic situation and in any case does not seem to involve tone/accent at all.

In Agaw, there has also been some restructuring of Subject and Object case forms in both Bilin and Awngi, the two languages which appear to have maintained a full tonal accent system. Traces of the older system, reflecting the East Cushitic pattern, can be deduced, however. Whilst both languages have formed a new, marked Object case (in Bilin, masc. -s, fem. -t;[19] in Awngi, both genders, -wa [surface and underlying]), the old Subject case in Awngi, and the old Absolute case in Bilin serve as the new unmarked form. So, whilst in Bilin masculine nouns in the new, unmarked Subject case end in a consonant (gədəŋ, 'dog', dan 'brother', ləŋəŋ, 'house', ʕaqʷ, 'water', əäb, 'mouth', gʷädəgʷ, 'belly', ʕəl, 'eye'), or the vowel -a (gərwa 'man', gämäna 'lion', šiwána 'beggar') corresponding to the Proto-LEC and indeed Proto-Cushitic short vowel-final and long vowel-final stems, Absolute case, in Awngi masculine nouns frequently end either in a consonant (gséŋ 'dog', sén 'brother', ŋə́n 'house', guzəg 'belly', ə́ll 'eye') or in the vowel -i (aqí 'man', dəγʷarí 'donkey', dúri 'cock', yimántí 'beggar') corresponding to the same stem classes, but this time deriving from an old Subject case. It is only in Kemant that the original Subject-Object case contrast survives; here masculine nouns can be divided into two broad classes, as in other Agaw languages: consonant-final and vowel-final stems, respectively. Whilst consonant-final nouns like nə́ŋ 'house', áxʷ 'water', gə́zəŋ 'dog', zän 'brother', etc., do not distinguish the Subject from the Absolute case,[20] vowel-final masculine nouns in -a like färza 'horse', bíra 'ox', də́γʷära 'donkey', etc., change this to -i in the Subject case, and what is more, this -i is in most nouns of this class accented: färzí, birí, dəγʷärí. It would not seem unreasonable, then, to relate this suffix -í with the LEC Subject case affix -í (specifically the long vowel-final stem form -íi),[21] including the High tone. In Agaw, as in Afar, this suffix is restricted to masculine nouns, and feminine nouns do not distinguish the Subject from the Absolute case. This, too, may be taken as an archaic trait, and the developments seen in Oromo and Somali can be understood as innovations.

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[19] See Appleyard 1989, p. 585, for a discussion of these forms and the restructuring of this part of the case system.

[20] Sasse 1974, p. 59, notes Subject case forms nə́ŋ(ə), áxʷə ~ axʷə́; in Appleyard 1975, p. 319, and *passim* this final -ə appears as an optional addition to other consonant-final forms, nouns and verbs, a structural explanation for which is difficult to find.

[21] Like Somali and Afar, Agaw has lost Proto-Cushitic final short vowels and

3 Gender

From example (11) above it can be seen that tone also plays a rôle in the differentiation of gender in the noun in Somali, as for example between ínan 'boy' and inán 'girl'. Incidentally, as the plurals of nouns of five out of the seven declensional classes in Somali also involve a reversal of gender, masculine singulars becoming feminine in the plural, and vice versa, tone may additionally play a rôle in number marking. Indeed, in one class this is done by tone alone, as in èy 'dog' : éy 'dogs' in (11). Because of the close involvement between gender and number in Somali, as in other Cushitic languages, it is better, however, not to regard this as a separate category of the use of tone in the morphology, but as a manifestation of the general gender system.

(17)

MASC	FEM	
ínan	inán	'boy; girl'
nàyl	náyl	'male lamb; female lamb'
matàan	matáan	'male twin; female twin'
mádax	madáx	'head; heads'
àwr	áwr	'male camel; male camels'

In Standard Somali all masculine nouns (excluding some suffixed plural forms) have the accent on the penultimate mora, whilst feminine nouns ending in a consonant have the accent on the last mora and those ending in the vowel -o (but not other vowels) are accented on the penultimate mora (this again excludes some plural forms). In

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reduced final long vowels. See Appleyard, forthcoming.

either gender monosyllables can of course only be accented in the same way. So:

(18)

MASC		FEM	
{ i̍ nan} ínan	'boy'	{in a̍ n} inán	'girl'
{n a̍ il} nàyl	'lamb'	{na i̍ l} náyl	'lamb'
{n i̍ n} nín	'man'	{na a̍ g} náag	'woman'
{a a̍ bbe} áabbe	'father'	{ho o̍ yo} hóoyo	'mother'
{ a̍ f} áf	'mouth'	{k a̍ b} káb	'shoe'

Comparative exidence from other Somali dialects, notably Af-Jiddu (spoken in southern Somalia) reveals that Northern Somali (including Standard Somali) has undergone an accent shift,[22] firstly in feminine nouns from the final mora to the penultimate with the later regular loss of an old short final vowel, and secondly, as a result of the first shift, in masculine nouns from the penultimate to the antepenultimate mora again with the reduction of the final syllable (-V > 0; -VV > -V). The operation of the first shift becomes clear when we, for example, compare the word for 'bird': Af-Jiddu šibbirə́, North Somali shimbír, both from *kimbiró (cf. Rendille čimbir, Afar kimbiró); or 'ear': Af-Jiddu d'egə́, North Somali dhég, both from *d'agí (cf. Afar xag 'cheek', Burji d'ága 'ear'). The operation of the second shift may be illustrated by comparing such as Af-Jiddu gáal (i.e. ga a̍ l) 'camel' and North Somali gàal (i.e. g a̍ al) both from *gaála.

In Afar, too the position of the accent plays a rôle in the differentiation of genders, though here there is the additional factor that whilst amongst simple (non-deverbal) nouns, those that are consonant-final are masculine, of those that are vowel-final, masculines are accented on the penultimate vowel and feminines typically on the last vowel. So:

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[22] See Lamberti 1986, pp. 182–4. Some of the details of Lamberti's argument are perhaps not clear, but the principle is undoubtedly correct.

(19)

Masc	Fem
áwka 'boy'	awká 'girl'
toobokóyta 'brother'	toobokoytá 'sister'
dúmmu 'male cat'	dummú 'female cat'
idáltu 'old man'	idaltó 'old woman'

The accented vowel-final feminines are reminiscent of Lamberti's reconstructions for Proto-Somali as described above, cf. Afar kimbiró 'bird', etc.

In Oromo (Booran), too, there is often some accentual difference between masculine and feminine nouns, though here the distinction is not as clear as in Somali and Afar. Amongst monosyllabic roots (i.e. not counting the final voiceless vowel as in nám^{a} 'man') 92% of masculine nouns have High tone, whilst 75% of feminines do not.[23] Amongst disyllabic roots, masculine nouns generally have ultimate accent and feminines penultimate accent; amongst nouns ending in a long vowel (-VV, realised as -V? in isolation) the situation is not quite so clear, though feminines do tend to place the accent on the penultimate syllable.

(20)

Masc	Fem
nám^{a} 'man'	du ^{a} 'death'
arráb^{a} 'tongue'	íntal^{a} 'girl'
máta?~matá? 'head'	áayya? 'mother'

In other dialects the situation is even less clear and seems to differ at times markedly from what has been described for Booran. Thus, in Harar Oromo, the gender of a noun cannot be predicted at all from its accentual patterning; contrast, for instance, Harar intalá 'girl' and namá 'man' with the Booran data, above. Here there are only certain tonal patterns permitted, only the penultimate or final syllable of a root can have High tone and all nouns must have at least one High tone. In Wellega Oromo, too, the rules for accent placement would appear to be associated with the syllabic shape of the root.

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[23] See Owens 1980, p. 150.

26

It is difficult to see how this picture can be reconciled with that found in Somali and Afar. Even in a conservative dialect like Booran the evidence of such as arráb^{a} and íntal^{a} seems to contradict this evidence directly. Nonetheless, it is certainly of some significance that in Booran tone/accent does play some rôle in distinguishing the two genders and it would not be remiss, I think, to hypothesise that in Proto-LEC, too, tone had a rôle to play in this morphological function. In other LEC languages, such as Konso, or Arbore, or even in other East Cushitic languages or language groups, such as Dullay, or HEC (Sidamo), where tone does play some part in morphological marking, if at times rarely on its own, it does not appear that it is specifically involved in gender marking. A word of caution, however, needs to be repeated here: much work still has to be done on the accentual systems of Cushitic languages in general, particularly outside the field of the better-known languages. The place of tone is therefore not yet properly understood for the grammars of many languages that, in the event, may have an important part to play in the history of Cushitic suprasegmentals and the reconstruction of the proto-system.

Outside of East Cushitic, in Beja and Agaw, again tone/accent does not play a rôle in gender distinction. In Beja, feminine and masculine nouns are chiefly distinguished by syntactic features such as concord, though feminine NPs will always contain at least one occurrence of the marker -t-, though not necessarily attached to the (head) noun itself[24]. In direct, contrasting pairs this affix alone distinguishes genders and the accentual pattern is not affected. No system of contrasting accentual pattern can be observed in other nouns either. So:

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[24] See Hudson 1976, p. 107.

(21)

Masc	Fem
yàas 'dog'	yàas-t 'bitch'
ták 'man'	tak-át 'woman'
báaba 'father'	dée-t 'mother'

Similarly, in Agaw, there is no distinctive accentual pattern for masculine and feminine nouns. In Awngi, feminine derivatives of masculine nouns keep the accentual pattern of the root, marking the feminine ending with High tone (-á) if the masculine ending is marked (-í), otherwise with low tone. So:

(22)

Masc	Fem
muliqísí 'monk'	muleqésá 'nun'
árfí 'month'	árfá 'moon'
dəγʷarí 'male donkey'	dəγʷará 'female donkey'
sén 'brother'	séna 'sister'
amét 'year'	améta 'next year'
dúri 'cock'	dúra 'hen'

Feminine nouns without corresponding masculine forms may be accented either on the root, the affix, neither, or both: cíγa 'bride', bazrá 'mare', γuna 'woman', bə́qlá 'mule'.

Whilst it may, therefore, be possible to reconstruct a rôle for tone in gender marking in Proto-LEC, at least, if not in East Cushitic as a whole, the evidence would not seem to allow the reconstruction of such a rôle at the Proto-Cushitic level.

4 Jussive

The last morphological category that I intend to examine here concerns one of the principal modal categories of the verbal system. For reasons of clarity of exposition I shall refer to this form as the Jussive, though its manifestations in the various languages may go under different names. Clearly formally connected with what is in many languages actually the form that expresses a request (i.e. Jussive, Optative, *sensu stricto*) is a paradigm which is sometimes called the Subjunctive, which is involved in certain types of subordinate clause (Somali) and focalisation constructions (Konso), and in Somali, too, and Oromo in the imperfective negative construction. The formal hallmark of this paradigm is the inflectional vowel o or u[25]. In Somali the Jussive (Optative) and Subjunctive functions have different accentual patterns, which in turn contrast with those of the declarative, indicative paradigms.

(23)

	OPTATIVE	SUBJUNCTIVE	NEG. PRES. HAB.	AFF. PRES. HAB.
1	aan kéeno	keenó	má keenó	keenaa
2	ad kéento	keentó	má keentó	keentaa
3m	há keeno	keenó	má keenó	keenaa
3f	há keento	keentó	má keentó	keentaa
1p	annu kéenno	keenó	má keennó	keennaa
2p	ad kéenteen	keentàan	má keentàan	keentaan
3p	há keeneen	keenàan	má keenàan	keenaan

Lamberti proposes that the accent on the final syllable (the penultimate mora of long vowel endings, 2p and 3p) is a common Proto-Somali feature for the Negative Present/Imperfective, though he seems to be incorrect in stating that the Subjunctive form, though

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[25] I shall deal here only with suffix-inflecting verbs of the common Cushitic type where the lexical verb stem essentially has suffixed to it the markers of person and tense/mood in that order.

segmentally identical, has no accent.[26] Inasmuch as it affects the argument here about the distinctive morphological rôle of tone, contrasting the Jussive from the Indicative paradigms, it should be noted that Lamberti also reconstructs the latter with final accent on the basis of non-Northern dialect forms. He ascribes the absence of High tone in the non-periphrastic indicative tenses, such as keenaa, to the operation of the distinctive Northern Somali focus system, and sees in the 'restrictive paradigm' (see example (1) diléy, the corresponding Present tense form would be dilá with High tone on the final vowel) the direct descendent in accentual terms, at least, of the 'Altsomali' form. However, whereas Lamberti suggests a form such as šeenə́ (Af-May), corresponding to Standard keenaa, Saeed[27] records šéenə; clearly the situation is complex and needs more work. Interestingly, though, in the Central (Af-May) dialect, too, as noted by Saeed, there is a limited accentual contrast between the non-periphrastic indicatives, Present šéenə, Past šéeni, and the first singular of the Jussive (Optative) šeenóy, but not in the other persons (the Negative Present is appended for reference):

(24)

		OPTATIVE	AFF. PRES.	NEG. PRES.
Af-May	1	šeenóy	šéenə	mə šéenə
	3m	šéenoy	šéenə	mə šéenə
	3f	šéentoy	šéentə	mə šéentə
	1p	šéennoy	šéennə	mə šéennə
	3p	šéeneeŋ	šéenaaŋ	mə šéenàaŋ

In Afar the paradigm with the function of Jussive (Optative) may be derived from the East Cushitic -u/-o paradigm, though with the addition of a further element -y, reminiscent of the Central Somali form. The simple paradigm survives only in a limited construction type as the sentential complement of certain other verbs.[28] Both forms are marked by penultimate accent, whereas the Indicative has no structural accent:

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[26] Lamberti 1986, p. 187

[27] Saeed 1982, p. 99

[28] So, Parker and Hayward 1985, p. 286, 'the U-Form'; Bliese 1981, p. 144, who

(25)

	JUSSIVE	SUBJUNCTIVE	PRESENT
1	fákay[29]	fáku	fakah
2	fáktay	fáktu	faktah
3m	fákay	fáku	fakah
3f	fáktay	fáktu	faktah
1p	fáknay	fáknu	faknah
2p	faktóonay	faktóonu	faktaanah
3p	fakóonay	fakóonu	fakaanah

In Oromo (Booran) the reflex of the East Cushitic -o paradigm occurs as the Jussive and the Negative Present (Imperfective), both of which have fixed High tone on the first syllable of the verb root, whilst in simple declarative sentences the Indicative tenses are without High tone.

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calls this form the 'Subjunctive', says that it also occurs in purpose clauses with the dative postposition -h added. Parker and Hayward treat this as a separate paradigm, the 'Purposive'.

[29] Bliese 1981, p. 141, suggests that this derives from *fáko+y and that the 'unstressed o is raised to u word finally' in the subjunctive. A further derivative of the -o form exists as the 'Consultative' (Bliese) or 'Requestive' (Parker and Hayward), but as this occurs only in a structure that is subject to sentence prosody, it cannot be used to illustrate the rôle of tone/accent in the morphological category under review: fakòo 'should I open?'

(26)

	JUSSIVE	NEGATIVE PRES.	PRESENT
1	—	hin d'úf^{u}	d'uf^{a}
2	—	hin d'úft^{u}	d'uft^{a}
3m	ha d'úf^{u}	hin d'úf^{u}	d'uf^{a}
3f	ha d'úft^{u}	hin d'úft^{u}	d'uft^{i}
1p	—	hin d'úfn^{u}	d'ufn^{a}
2p	—	hin d'úftan^{i}	d'uftan^{i}
3p	ha d'úfan^{i}	hin d'úfan^{i}	d'ufan^{i}

Similar forms and patterns occur in other dialects of Oromo: cf. Harar Oromo ha déem^{u} 'let him go', inní (hi)n déem^{u} 'he is not going', but inní deem^{a} 'he is going'. In Konso, which is most closely related to Oromo, slightly different patterns occur, but again with distinctive accentual marking on the Jussive (here more reminiscent of the Somali forms with the first and third persons distinguished) and the Negative Present (predicate topic forms), both continuing the old -o inflection.

(27)

		JUSSIVE	NEG. PRESENT	PRESENT (predicate topic)
Konso	1	ána-tóoyó	an-tóoyó	in-tóoya
	2	—	at-tóoytó	it-tóoyta
	3m	á-tooyo	in-tóoyó	i-tóoya
	3f	á-tooyto	in-tóoytó	i-tóoyta
	1p	íno-tóoynó	an-tóoynó	in-tóoyna
	2p	—	at-tóoytan	it-tóoytán
	3p	á-tooyen	in-tóoyan	i-tóoyán

From the above Somali, Afar and Oromo-Konso data it would be possible to reconstruct a Proto-LEC accentual pattern for the 3rd person Jussive with High tone on the initial syllable of the root, allowing for the transference of tone to the prefixed preverbal in

Standard Somali (há) and Konso (á).[30] This form is differentiated from the 'Subjunctive' in the same languages where the vowel of the inflexion carries the High tone, which may represent an archaic trait. Again, however, because of the incomplete nature of the data available across the field of East Cushitic, let alone Cushitic as a whole, it is not possible to say for sure what represents innovation and what is an archaic retention.

Unfortunately, the argument cannot be readily solved by having recourse to non-LEC languages, either Beja or Agaw, for instance, because it is uncertain to what extent the -o paradigm is retained or exists in them.[31] The Jussive (Optative) forms in both language groups appear to be of quite a different origin: Beja bá-tam-ì 'may I eat', also tam-ii-ày 'if I were to eat' and tam-ì ʔandì 'I intend to eat', all of which are built on the Past tense form. In Agaw, the various Jussive forms are also for the most part constructed on the Perfective-aspect base by means of various extensions, most commonly -n: Bilin gāb-ə-n 'let him refuse', Khamtanga k'äb-n-á 'let him cut', Kemant was-i-n 'let him hear', but Awngi des-ə́-s 'let him study'. The Awngi form is at least consistently marked with High tone on the inflexion regardless of the accentual pattern of the stem class.

5 Concluding remarks

In this brief survey of a few Cushitic languages it can be seen that tone/accent does play an important rôle in the morphology, and more importantly that it is to some extent possible to reconstruct tone/accent as a morphological device for earlier stages, particularly for Proto-LEC, but probably also by extension for Proto-Cushitic as well. At these earlier stages of reconstruction, it is likely that tone/accent did not function as a morphological device on its own, as may appear at present in such languages as Somali, but formed an intrinsic part of inflexional affixes in addition, perhaps, to being associated at the lexical level with root categories. It is likely also that the type of accentual system to be reconstructed for Proto-LEC or Proto-Cushitic should be the same as that which exists currently in many Cushitic languages, namely a simple two-term (High : Non-high) mora-counting system.

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[30] This is essentially Black's argument, 1974, pp. 124–5, where he contrasts a Proto-LEC Jussive (3m) *d'ál-o with the Subjunctive *d'al-ó.

[31] Zaborski 1975, p. 164, considers this a common Cushitic form, but it is uncertain to what extent such paradigms as the Agaw (Bilin) Subjunctive gäb-ró 'he (begins to) refuse' (but the cognate Kemant form is a Jussive was-du 'let him hear') or Gerund gäb-o 'he having refused' are reflexions of this form.

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DOWNDRIFT IN A TONE LANGUAGE WITH FOUR TONE LEVELS*

G. N. Clements

Many tone languages exhibit one form or another of *downdrift* (or *automatic downstep*): the lowering of high tones separated by low tones. In extreme cases, the realization of high tones at the end of a domain (such as the sentence) may be lower than the realization of low tones at the beginning. Tone languages having this property may be called "cross-level" tone languages (see Figure 1 on p. 39). In such languages, high and low tones must be distinguished by reference to the F_0 value of neighbouring tones, rather than to some absolute range of F_0 values.

As part of a phonetic study of pitch realization in African tone languages, field recordings of natural speech in the Anlo dialect of Ewe, recorded in Ghana in 1970, were submitted to analysis by a pitch computation programme designed by S. Maeda. This report is a summary of the results.

Anlo Ewe has four phonetically distinct tone levels, here labelled X (extra-high), H (high), M (mid), and L (low). Only two tone levels are lexically distinctive; underlying H and M tones are realised at one of these four phonetic tone levels by a set of regular and

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productive tone rules (Stahlke 1971, Clements 1977, 1978). The oral text analysed in this study consisted of an excerpt from a description of marriage customs given to the writer by G. K. Blebu, of Anyako, Volta Region. This text was an uninterrupted monologue uttered in a relaxed, conversational style.

The following prosodic units are relevant to a description of Ewe tone:

1. *the intonation group*, defined as the longest stretch of speech in which register raising or resetting does not occur. This unit generally coincides with one of the following four syntactic units:
    (a) the sentence,
    (b) a coordinate clause,
    (c) a subordinate clause introduced by the complementizer *be* (used, for example, to introduce reported speech), and
    (d) serial clauses.
2. *the tone group*, defined by occurrences of pause. Pauses usually occur between words at major syntactic breaks, or following prepositions. Register lowering (downdrift) is not interrupted by pauses; that is, downdrift is continuous within the intonation group, regardless of how many tone groups it consists of. Rules of phonological tone sandhi are restricted to the tone group, however. A further characteristic of the tone group is vowel lengthening in final position.

The text analysed consisted of 15 intonation groups, subdivided into 45 tone groups. Average values for register raising between intonation groups was 14.9 Hz, and for register lowering within intonation groups 13.6 Hz, computed by comparing F_0 values of high tones only. Within the intonation group, downdrift appeared to be uninfluenced by internal syntactic organisation, affecting tones within words to the same extent as tones across words. Slight differences were found, however, between the syntactic environment V NP (where NP is not a pronoun) and the genitival structure NP N (where N is phonologically CV(V)), in that downdrift across the first syntactic juncture averaged 4.9 Hz (for 10 tokens) and that across the second, only 1.1 Hz (for 8 tokens).

The most significant downdrift effect involved the H and M tone levels. These tones were found to overlap in F_0 quite consistently within the intonation group. For example, comparing the first mid tone and the last high tone within each intonation group, overlap of as much as 16 Hz could be observed:

intonation group	*first M tone*	*final H tone*
1	108 Hz	102 Hz
2	96	91
4	97	89
5	97	85
7	107	91

Significant overlap was not found between the X and H tone levels or the M and L levels. The average value of the interval between H and M levels is much lower than that between either of the latter two levels. The average drop between H and M was 9.6 Hz (15 tokens), and the average rise between M and H was 6.2 Hz (20 tokens). Another measure of the special status of the two central tone levels is that downdrift is very consistent across the tone sequence HMH (M consisting of one or more successive M tones), but not consistent across other sequences, including HLH. Thus 14 of the 17 tokens of HMH sequences showed downdrift of at least 2 Hz and averaging over 8 Hz, while only 2 of the 4 HXH sequences, and 4 of the 11 HLH sequences, showed downdrift. Also, only 3 of 10 MHM sequences showed downdrift affecting the two M tones.

As a further way of comparing the relative effect of downdrift on the four tone levels, each intonation group was divided into three parts of equal length. Average F_0 values were taken within each of these thirds for each tone level. The results are summarised below (number of tokens in parentheses), and shown graphically in Fig. 2 (on p. 40):

tone level	*first third*	*second third*	*third third*
X	129.4 (27)	125.9 (20)	123.6 (15)
H	107.8 (31)	102.4 (30)	96.2 (34)
M	101.6 (20)	95.0 (28)	90.6 (17)
L	87.7 (14)	85.0 (10)	84.4 (25)

It will be noticed that the drop between the first and third tone group is highest for the H and M tone levels (11.6 and 11.0 Hz, respectively, compared with 5.8 and 3.3 Hz, respectively, for the X and L tone levels). There is significant pitch overlap between the H and M tone levels but not between either of the two other adjacent tone levels. In particular, the average value of the X tone level at the final third is still well above the average value of the H tone at the first third. It should be pointed out that the procedure used here tends to underestimate the amount of downdrift from the beginning of the intonation group to the end, so that the total downdrift for each tone level is somewhat greater.

The average absolute difference between the adjacent tone levels in each third is summarised below:

F_0 difference between levels	*first third*	*second third*	*third third*
X,H	21.6	23.5	27.4
H,M	6.2	7.4	5.6
M,L	13.9	10.0	6.2

This way of displaying the data shows that the H and M levels maintain a fairly constant interval between them across the intonation group, while the interval between the X and H levels increases and the interval between the M and L levels decreases.

Summary. While downdrift affects all tone levels to some extent, its effect is greatest on the two central tone levels. One interpretation of this result might be that downdrift affecting the peripheral tone levels is to be considered a declination effect, not subject to control by the speaker, while downdrift across the medial tone levels is a linguistic effect comparable to the "automatic downstep" familiar in many languages with two tone levels. Finally, since absolute values of H tones at the end of the intonation group are characteristically lower than values of M tones at the beginning, the Anlo dialect of Ewe may be regarded as a *cross-level* tone language in the terms presented at the outset of this paper, at least as far as its H and M tone levels are concerned.

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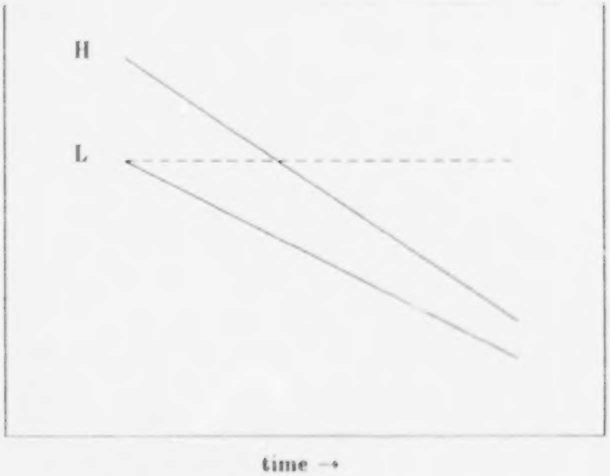

Figure 1: A cross-level tone language. H tone drops into the pitch region initially occupied by L tone.

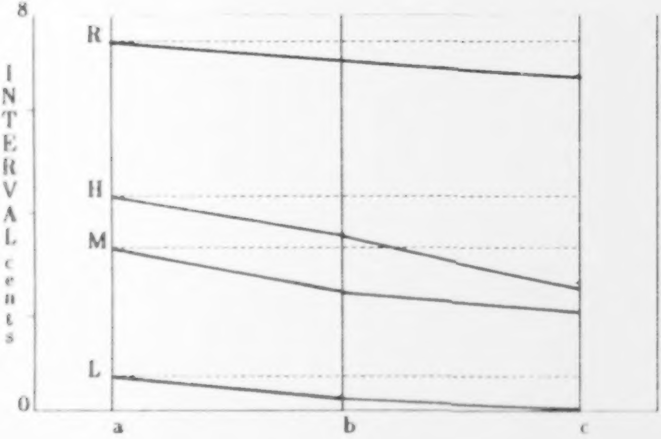

Figure 2: Tone registers in Ewe (Anlo dialect). The descending solid lines represent projected values for each of the four registers, based on tone values averaged over the first third (a), second third (b), and final third (c) of the intonation group.

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NON-PITCH EXPONENTS OF ACCENT AND STRUCTURE IN JAPANESE*

John Coleman

Overview In this paper I will examine some Japanese examples of a number of common (putatively universal) phonological phenomena:

1. *Whispered vowels*: in segmental accounts of Japanese phonology, it is said that close vowels are whispered or 'devoiced' when they occur either between voiceless consonants or utterance-finally after voiceless consonants, subject to certain accentual restrictions (e.g. /kikai/ pronounced as [ki̥kai]).
2. *Nuclear friction*: this is a descriptive term for the phenomenon which is usually characterised as the accent-dependent deletion of close vowels following fricatives and affricates (e.g. /hasi/ pronounced as [haʃː] or /hikooki/ pronounced as [çkoːki̥]).
3. *CV coarticulation*: the similarity between distinctive vowel qualities and the secondary articulation of neighbouring consonants.

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I reassess the segmental and transformational characterisations of these and related phenomena, and show that by paying more careful attention to phonetic detail, and abandoning conventional preconceptions about phonological segmentation, the diverse mechanisms that have been invoked in previous analyses can be replaced by a more coherent, parsimonious and empirically faithful account. This account combines the conceptual content of Firthian Prosodic Phonology with the formal resources of Unification Grammars (Shieber 1986) and makes reference to a number of temporal/structural domains or units, including the mora and syllable, but not the segment.

Japanese orthography suggests a way of simplifying the phonological analysis of whispered vowels. Observing that in moras with a voiced onset the vowel is never whispered, I distinguish two types of mora, 'voiced' and 'voiceless', and specify not when vowels are 'devoiced', but the circumstances in which vowels in 'voiceless' moras are exceptionally voiced. This integrates well with the Japanese accent system, in which plain voiced items are relatively marked, voicing being one of the exponents of accent. I have observed word-final "whispered high vowels" in Mandarin and Cantonese Chinese, and Swahili, in similar phonological structures and with similar phonetic exponents, and they are also reported to occur (or rather, to have occured) in Swazi (Ziervogel 1952:12), Zulu (Doke 1926:178–9) and other Bantu languages, including Lamba, Kaonde, Xhosa, Sotho, and Tswana (Doke p. 179). Since these languages have quite a similar phonotactic structure to Japanese, the present paper may be of interest in the analysis of a great many languages.

I show that the "vowel deletion" analysis of nuclear friction is unsupported on both theoretical and empirical grounds. Phonetically, the exponents of onset and rime are simply phased differently under different accentual circumstances. In unaccented moras, the friction of the onset and the vowel qualities of the nucleus may completely overlap. A non-derivational analysis which is not restricted to a linear sequential arrangement of consonants and vowels and which distinguishes phonological representations from their phonetic interpretations can reflect this quite elegantly, whereas a derivational, segmental analysis is necessarily clumsy.

Phonologists and phoneticians have frequently argued that the regressive spreading of certain vowel qualities to neighbouring consonants is not determined phonologically, and have treated the phenomenon as an instance of putative universal coarticulation principles. I argue that the particular instances of CV coarticulation found in Japanese cannot be interpreted as *necessary* processes, and that this type of assimilation is a bona fide phonological phenomenon. In my analysis, some vowel and consonant features are specified for the entire mora. The secondary articulation of consonants derives not from spreading or copying of features from a vowel, but, just as in the analysis of phonatory features, from prosodic vocalic features of each mora. This results in a simpler, more parsimonious solution, achieved with greater phonetic fidelity.

Adoption of different subcategories of moras (through the annotation of mora-units with distinguishing prosodic features) also permits the distribution of particular types of mora within syllables and larger units to be stated extremely simply. Since all the vocalic features are specified for entire moras, the need for a CV tier is called into question.

I thus show that the mora in Japanese is not just an analytically convenient rhythmic or metrical construct (for example, a regular beat), but is also the structural domain for a number of interacting phenomena. I also show that these phenomena, though superficially diverse, form a unified class.

As in other components of Unification Grammar, the phonological formalism is *non-derivational* (and hence highly restrictive), *compositional* (and hence tractable), and careful to distinguish 'syntax' (phonological notation) from 'semantics' (phonetic denotation). In general, this gives it the flavour of a "type, token and distribution" approach to phonology, with the addition of an explicit theory of phonological *structure*.

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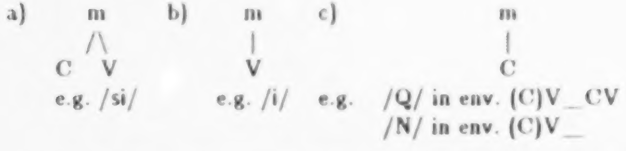
1 Phonotactics

Japanese and western linguistic traditions alike view Japanese as being constructed from small phonological elements called moras. There are three mora patterns in Japanese: CV, V and C (1). The class of consonantal articulations found in C moras is quite different from those found in CV moras, C mora consonants being either mora nasals or mora obstruents, unspecified for place of articulation. These are therefore traditionally labelled as N and Q respectively, to distinguish them from the Cs of CV moras.

1) Japanese mora structures



We may also view Japanese as being constructed, like other languages, from syllables. Moras are combined to give the following basic syllable-structures:[1]

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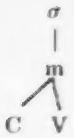
[1] I enumerate here only the syllable structures consisting of one and two moras. In addition to one- and two-mora syllables, a few words containing diphthongs in closed syllables ($2V+1C=3$ moras), triphthongs (3-moras), and apparent syllable-final consonants and clusters resulting from final vowel devoicing give rise to the existence of a small number of three- and four-mora syllables, such as /waiN/ *wine*, /baai/ *occasion, event*/, /yaei/ *bivouac*, /guai/ *condition, health*, /naif̥/ *knife*, /ais̥/ *ice*, /touf̥/ *bean-curd*, /paNts̥/ *pants*. These forms are almost without exception either loan-words from English or Chinese, or phonetically monosyllabic variants of disyllabic sequences, arising from 'devoicing' or 'eclipse' of the final vowel. The rationale for the analysis of the syllable-final fricatives and affricates as CV moras in e.g. [its̥] is discussed at length below.

2) Syllable structures

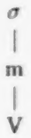
One-mora syllables:

a)



e.g. /ki/ *a tree*

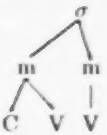
b)



e.g. /i/ *a well*

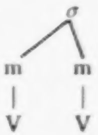
Two-mora syllables:

c)



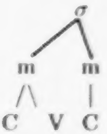
e.g. /koo/ *thus*

d)



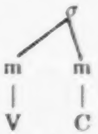
e.g. /ii/ *good*

e)



e.g. /saN/ *three*
/siQ/

f)



e.g. /oN/ *a sound*
/iQ/

The analysis of three- and four-mora syllables is more problematic, and will not be pursued further here (cf. footnote 1).

In order to offer a "feel" for the implications and coverage of this analysis, consider the Japanese pronunciations of some familiar trade-names and loanwords, together with their analysis into moras and syllables:

3)

```
 s   s   s
 |   |   |
 m   m   m
/ \ / \ / \
C V C V C V
| | | | | |
s u b a r u
```

3 syllables, 3 moras

```
 s   s
 |   |
 m   m
/ \ / \
C V C V
| | | |
s u shi
```

2 syllables, 2 moras

```
 s   s   s
 |   |   |
 m   m   m
/ \ / \ / \
C V C V C V
| | | | | |
s u z u k i
```

3 syllables, 3 moras

```
 s   s   s   s
 |   |   |   |
 m   m   m   m
/ \ / \ / \ / \
C V C V C V C V
| | | | | | | |
f u j i y a m a
```

4 syllables, 4 moras

```
   s   s    s
  /\   |    |
 m  m  m    m
/ \ | / \  / \
C V V C V  C V
| | | | | /  |
d a i h a ts u
```

3 syllables, 4 moras

```
 s     s    s     s
 /\    |    /\    /\
m  m   m   m  m  m  m
| / \ / \ / \ | / \ |
V C V C V C V V C V V
| | | | | | | | | | |
e s u k u r e e t a a
```

'escalator'
4 syllables, 7 moras

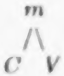
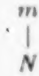
```
 s       s
 |      /\
 m      m  m
/ \   / \ |
C V   C V N
| | /   | |
d a ts  u n

2 syllables, 3 moras
```

```
   s     s
  /\    /\
 m  m  m  m
/ \ | / \ |
C V Q C V N
| | | | | |
n i p p o n

2 syllables, 4 moras
```

```
   s     s
  /\    /\
 m  m  m  m
/ \ | / \ |
C V Q C V N
| | | | | |
n i s s a n

2 syllables, 4 moras
```

Such a set of phonotactic structures can be defined by a context-free phrase structure grammar of the type familiar from sentence-level syntax. A first attempt at formulating such a grammar, which can be viewed equivalently as either a set of rewrite rules, or as a set of local tree constraints, is presented in (4).

4)

		Tree-constraints	Rewrite-rules
Rule 1)	Single-mora syllables		$\sigma \rightarrow m$
Rule 2)	Branching, 2-mora syllables		$\sigma \rightarrow m \quad m$
Rule 3)	V moras		$m \rightarrow V$
Rule 4)	CV moras		$m \rightarrow C \quad V$
Rule 5)	Nasal mora		$m \rightarrow N$
Rule 6)	Obstruent moras		$m \rightarrow Q$

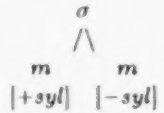
These 6 rules are not adequate:

- Rule 2 does not distinguish between subcategories of mora. It will be necessary to do so, since C moras may only occur syllable-finally, and if the second mora is CV, C must be voiceless, V close, and C and V coextensive in time. I shall refer to N, Q, nonsyllabic V and coextensive $\begin{matrix} C & V \\ [-voi] & [+high] \end{matrix}$ (e.g. /s(u̥)/, /f(u̥)/, /s(i̥)/ etc.) as 'marginal' moras, since they occur in syllable margins, and syllabic V and sequenced CV moras (e.g. /se/, /to/ etc.) as 'nuclear', since they contain a syllable nucleus. Rule 4 does not determine the marginal vs. nuclear distinction between different types of CV mora. The above grammar sanctions all types of mora in both first and second place in a syllable, and thus overgenerates.

- Major similarities of distribution and behaviour of the nasal and obstruent moras (cf. (1) above) are also not adequately accounted for by rules 5 and 6.
- Similarly, further necessary contextual restrictions on the distribution of the obstruent mora (cf. (1) above) are lacking in rule 6.
- Although three-mora syllables (such as /naif(u)/ *knife*) have been disregarded here, their analysis may prove to have consequences for the analysis of one- and two-mora syllables.

With reference to rule 2, I shall describe the distribution of consonantal moras in branching syllables. The final mora of such syllables must be marginal, whereas the first mora must be nuclear. Let us adopt the syntagmatic feature specification $[+syl]$ ('syllabic') to indicate nuclear constituents, and $[-syl]$ ('non-syllabic') to indicate marginal constituents. Rule 2 must be replaced by the following rule (Rule 7):

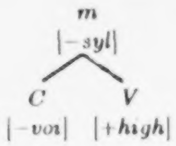
Rule 7)



or $$\sigma \rightarrow \underset{[+syl]}{m} \quad \underset{[-syl]}{m}$$

Rule 8 requires coextensive $\overset{C}{[-voi]}\ \overset{V}{[+high]}$ moras and nasal and obstruent moras to bear the feature specification $[-syl]$:

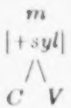
Rule 8a)



or $\underset{[-syl]}{m} \rightarrow \underset{[-voi]}{C} \quad \underset{[+high]}{V}$

where the phonetic exponents of C and V are coexistensive in time;

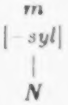
Rule 8b)



or $\underset{[+syl]}{m} \rightarrow C \quad V$

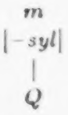
where the phonetic exponents of C and V are not completely coextensive;

Rule 9)



or $\underset{[-syl]}{m} \rightarrow N$

Rule 10)



or $\underset{[-syl]}{m} \rightarrow Q$

This almost gives us an adequate characterization of the nasal and obstruent moras. The following simplification will suffice at this point:

$$N = \overset{m}{\begin{bmatrix} -syl \\ +nas \end{bmatrix}} \qquad Q = \overset{m}{\begin{bmatrix} -syl \\ -nas \end{bmatrix}}$$

I shall defer further discussion of these representations and their phonetic interpretation until section 6.

Turning now to the combinatorial restrictions that operate within CV moras, table 1 shows many of the combinations of consonants and vowels that may form a mora. The categorisation of consonants and vowels is based on the most widely-employed phonemic analysis. The entries in this table are "reading transcriptions". Further detail is provided where relevant in the discussion below.

2 Variants of /i/ and /u/

In table 2 a selection of normalized extracts from my impressionistic phonetic records is presented. These are representative examples of the moras whose analyses are given in lines 3 and 4 of table 1. Each of these is attested in a number of variant forms, some of which can be shown to be context-specific.

The superscripted ^{i}, ^{u}, and ^{o} indicate the cavity resonance (that is, the 'secondary articulation' or 'vocalic colouring') of consonantal articulations. ^{i} indicates clear, palatal, front resonance, with no liprounding; ^{u} indicates dark, velar, back resonance with protruded spread lips; and ^{o} indicates a more central quality, with noticeable liprounding.

The most obvious variance is seen in the stricture of the nucleus in each case. I have distinguished fricative nuclei from whispered and voiced vocalic nuclei[2]. By 'nucleus', I mean the period of continuant

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[2] Beckman and Shoji (1984) are typical in failing to distinguish whispered from fricative nuclei (cf. also Ohso 1973). For specific details of laryngeal activity, Yoshioka (1981) is more informative.

Table 1: 'CV' and 'CyV' moras

		/a/	/i/	/u/	/e/	/o/
1		a	i	u	e	o
2	/k/	ka	ki	ku	ke	ko
3	/s/	sæ	ʃi	su	se	so
4	/t/	tæ	tʃi	tsu	te	to
5	/n/	næ	ɲi	nu	ne	no
6	/h/	ha	çi	Φu	he	ho
7	/m/	ma	mi	mu	me	mo
8	/y/	jæ		ju		jo
9	/r/	ra	ri	ru	re	ro
10	/w/	wa				
11	/ky/	kʲæ		kʲu		kʲo
12	/sy/	ʃæ		ʃu		ʃo
13	/ty/	tʃæ		tʃu		tʃo
14	/ny/	ɲʲæ		ɲʲu		ɲʲo
15	/hy/	çʲæ		çʲu		çʲo
16	/my/	mʲæ		mʲu		mʲo
17	/ry/	rʲæ		rʲu		rʲo

Notes:

1. [u] represents an unrounded close back vowel
2. [ʃ] represents voiceless alveo-palatal friction
3. [r] represents a light alveolar tap
4. [ɲ] represents palatal or alveo-palatal nasality
5. [k], [t] represent aspirated stops

Table 2: Variants of /i/ and /u/.

a) "tV" moras:	Front	Back
Fricative nucleus: (Syllabic continuant)	$t\,\overset{i}{\text{ʃ}}:$	$t\,\overset{u}{s}:$
Whispered nucleus:	$t\,\overset{i}{\text{ʃ}}\,\underset{\circ}{i}$	$t\,\overset{u}{s}\,\underset{\circ}{u}$
Close vocalic nucleus:	$t\,\overset{i}{\text{ʃ}}\,i$	$t\,\overset{u}{s}\,u$
Half-open vocalic nucleus:	$\overset{i}{t}\,e$	$\overset{o}{t}\,o$
Open vocalic nucleus:	$\overset{i}{t}\,a$	

b) "sV" moras:	Front	Back
Fricative nucleus: (Syllabic continuant)	$\overset{i}{\text{ʃ}}:$	$\overset{u}{s}:$
Whispered nucleus:	$\overset{i}{\text{ʃ}}\,\underset{\circ}{i}$	$\overset{u}{s}\,\underset{\circ}{u}$
Close vocalic nucleus:	$\overset{i}{\text{ʃ}}\,i$	$\overset{u}{s}\,u$
Half-open vocalic nucleus:	$\overset{i}{s}\,e$	$\overset{o}{s}\,o$
Open vocalic nucleus:	$\overset{i}{s}\,a$	

(There are also many context-specific variants of the moras with half-open and open vocalic nuclei, but that variance is beyond the scope of the present paper.)

articulation (i.e. vocalicity or friction) that gives a mora its duration. Nucleus whispering in Japanese is a very commonly described phenomenon: in segmental terms, it is often said that close vowels are whispered or 'devoiced' when they occur either between voiceless consonants or utterance-finally after voiceless consonants, subject to certain accentual restrictions (Ueda 1976, Hasegawa 1979a, 1979b, and Haraguchi 1984). Nuclear friction is a descriptive term for the phenomenon which is usually presented as the accent-dependent deletion of close vowels following fricatives and affricates (Ueda 1976 ex. 4). Note, however, that in fricative nuclei the so-called 'deleted' vocalic quality is actually *present* and audible in the secondary articulation of the fricative nucleus (Schane 1970:510). If this observation is of phonological relevance (and I shall argue that it is), in a segmental, derivational account it would have to be proposed that the vocalic quality of the vowel is copied to the consonant as palatal secondary articulation (velar in the case of 'back-nucleus' moras), before the vowel is deleted (cf. Ohso 1973).

Furthermore, if an analysis of nuclear friction includes the proposal that a segment or timing unit is deleted, the material which remains after such deletion ought to be of shorter duration than a CV mora. This is not the case: notice in table 2 the increased duration of the period of friction in fricative-nucleus moras relative to their whispered and close vocalic counterparts. In short, if a vowel deletion rule is proposed, there must also be a rule that assigns extra duration to the friction units, or a compensatory lengthening rule (Ingria 1980, de Chene and Anderson 1979; Prince 1984; Fukui 1986; Wetzels and Sezer *eds*. 1986; Poser 1986, 1988) to account for its somewhat increased duration.

Classical phonemic accounts of Japanese phonology invariably encounter difficulties in analysing the patterns (illustrated in table 2) of palatalization and affrication of voiceless coronal consonants before close (high) vowels. If each mora is analysed as the simple concatenation of consonantal onset and vocalic nucleus, the phonetic realizations of t-line (line 4) moras as [tæ], [tʃi], [tsu], [te], [to], and s-line (line 3) moras as [sæ], [ʃi], [su], [se], [so] suggest context-dependent variation[3] of the form:

/t/ is realized as:

- [tʃ] before [i][4],
- [ts] before [u],
- [t] before any of the other vowels.

/s/ is realized as:

- [ʃ] before [i],
- [s] before any of the other vowels.

For instance, Daniels (1958:58-9) writes:

> "In all cases, [ts] may be regarded as a variant of [t] ...under the influence of [u] or [ʊ] ...When prefixed to [i] or [ɪ] ..., [tʃ] may be regarded as a variant of [t], ...and [ʃ] as a variant of [s], under the influence of these vowels".

---

[3] Bloch (1950) and Jinushi (1967) are exhaustive and thorough in detailing these variations.

[4] Hattori (1967) disputes this analysis (which originated essentially with Trubetzkoy (1939), but was endorsed and popularised by Bloch (1950)), due to the occurence of [ti] in loanwords such as [pa ti]'party'. Though I agree with both Bloch and Hattori that at some place in the phonology loanwords that have been fully incorporated into the lexicon must be accounted for in the same terms as native forms, Bloch actually anticipated Hattori's objection by showing that 'innovating' and 'conservative' speakers make different distinctions between [ti] and [tʃi]. I shall consider native Japanese and Sino-Japanese elements and systems only. For the 'innovating' speakers, the [ti] of [pa ti] is analogous to the nasal vowels produced by innovating English speakers in pronouncing certain loans from French. We would not propose, however, that nasal vowels have systemic status in English generally, even for 'innovating' speakers.

Problems arise in placing the Sino-Japanese moras [tʃæ], [tʃu], [tʃo] (line 13), [ʃæ], [ʃu], [ʃo] (line 12) into this scheme, for there is now, apparently, a set of mora-initial consonantal contrasts with [tæ], [tsu], [to], [sæ], [su] and [so]. Numerous analyses (e.g. Bloch 1946, 1950; McCawley 1968) have proposed to represent the distinctively palatalized series of onsets as /ty/, /sy/ and so on, giving a repertoire of moras that includes the following:

CV	/ta/,	/ti/,	/tu/,	/te/,	/to/
	/sa/,	/si/,	/su/,	/se/,	/so/
CyV	/tya/,		/tyu/,		/tyo/
	/sya/,		/syu/,		/syo/

In this analysis the treatment of palatalization has not been carried through to include /ti/ and the other /Ci/ moras. In /ti/, the initial consonant is interpreted as the 'naturally' palatalized variant of /t/ that occurs before /i/, whereas for /tya/, /tyu/ and /tyo/, palatality is attributed to the presence of a 'glide' /y/.[5]

3 Transformational account of palatalization and affrication

I shall now consider how a transformational analysis might address the problems considered above. An advocate of the transformational approach would hope to be able to arrive at redundancy-free lexical entries and a minimal grammar by employing a suitable feature-system, incrementally deriving the intended surface (allophonic) representations through the successive application of rules of the required generality and parsimony to lexical (morphophonemic) representations. For example, (5) applies irrespective of voicing and backness, compressing in a single formula the specification of affrication of coronal stops (/t/, /d/), before high vowels (/i/, /u/).

---

[5] In Jinushi's (1967) study, this failing of earlier analyses is expressed in the following words: "the traditional analyses of "shibilants" are hard to accept from our point of view, because they exhibit instances of phonemic overlapping. For instance, [ʃ] is interpreted as a single phoneme /s/ before a high front vowel, and as a sequence /sy/ before other vowels. The same difficulty is also found in the interpretation of the prepalatal affricate". (Jinushi 1967: 13)

5) Affrication 1

$$\overset{C}{\begin{bmatrix} +\mathit{obs} \\ -\mathit{cnt} \\ +\mathit{cor} \end{bmatrix}} \rightarrow [+\mathit{del\ rel}] / \_\_ \overset{V}{[+\mathit{high}]}$$

[*del rel*] is a feature that has attracted much criticism, (Ewen 1980, 1982; van der Hulst and Smith 1982a:5 for a summary and further references) since it is the only feature in the SPE system (Chomsky and Halle 1968) with an implicitly dynamic interpretation. Its utility is dependent on considerations such as the following:

Suppose that instead of rule (5) a rule such as (6), which explicitly inserts a coronal continuant between the initial stop and the nuclear vowel, is employed.

6) Affrication 2

$$\emptyset \rightarrow \mathrm{s} / \mathrm{t}\_\_ \left\{ \begin{matrix} \mathrm{i} \\ \mathrm{u} \end{matrix} \right.$$

A fuller, more general expansion of this would be:

7) Affrication 3

$$\emptyset \rightarrow \overset{C}{\begin{bmatrix} +\mathit{obs} \\ +\mathit{cnt} \\ +\mathit{cor} \\ \alpha \mathit{voi} \end{bmatrix}} / \overset{C}{\begin{bmatrix} +\mathit{obs} \\ -\mathit{cnt} \\ +\mathit{cor} \\ \alpha \mathit{voi} \end{bmatrix}} \_\_ \overset{V}{[+\mathit{high}]}$$

By familiar argumentation, (5) is judged preferable to (7) since it is more parsimonious. Furthermore, using [*del rel*], the functional, distributional and structural unity of affricates is captured and a simple two-segment CV mora-structure is maintained.

However, (7) also has certain advantages:

i) It states the unity of place of articulation of affricates explicitly, rather than implicitly as with [*del rel*]. The advantage of this explicitness for a phonetically general and well-founded phonological theory is that phenomena such as nasal or lateral release, such as [t^n] and [t^l], can be represented using feature-matrices that directly parallel that which specifies [ts].

ii) The cooccurence of the features [+*del rel*] and [−*cnt*] seems counterintuitive, if column-vectors are intended to represent features that are cotemporal, for the whole point behind the [+*del rel*] representation of affricates is that it obviates segment-internal structure such as:

$$\begin{bmatrix} & +obs & \\ -cnt] & & [+cnt \end{bmatrix}$$

iii) A tempting reason for representing the affricate [ts] as a sequence of two feature-matrices is that in Japanese the distinct item /s/ is also palatalized before /i/, just like the affricate [ts]. In other words, (6) feeds (8), which is independently required, so that greater parsimony and integration than the rigidly phonemic analysis is achieved.

8) Palatalization

$$\text{s} \rightarrow \text{ʃ} / \_\_\ \text{i}$$

In the case of the partially derived affricate [t-ʃ], it must also be specified that the initial [t], in its turn, is palatalized:

9) Regression of Palatalization

$$\mathrm{t} \rightarrow \mathrm{t}^{j} / \_\_\,\text{ʃ}$$

This rule would not be required in an analysis which employed [*del rel*].

Using [*del rel*] to express affrication, the 'spreading' or 'regression' of palatalization to the stop portion becomes chimerical, and we may express (8) more generally as (10):

10) Self-feeding palatalization

$$C \rightarrow \begin{bmatrix} +high \\ -back \end{bmatrix} / \quad \begin{bmatrix} +high \\ -back \end{bmatrix}$$

(10) is fully regressive. That means it can iteratively apply over any string of consonants that precedes $\overset{V}{\begin{bmatrix} +high \\ -back \end{bmatrix}}$.

This is phonetically plausible, since consonants immediately preceding /Ci/ moras (i.e. obstruent or nasal mora consonants) *are* palatalized e.g. in [mattʃi] "matches" or [geɲki] "health". Since the palatalization rule is, in its simplest form (10) self-feeding, representing affricates as sequences of segments is an attractive possibility.

Without pursuing this discussion any further, it is clear that due to the segmental basis of the transformational model, there is no motivated way to choose between these two possible analyses of affrication in that model's own terms. The advantages of the feature [*del rel*] are its abbreviatory value and the fact that it reflects the functional unity of affricates; but these benefits are more-or-less negated by the cost of lost generalizations.

4 Coarticulation

Phonologists and phoneticians have frequently argued that the regressive spreading of palatality before high front vowels is not phonologically relevant (e.g. Campbell 1972 n. 11, Ladefoged 1975:49), and have treated the phenomenon as an instance of universal coarticulation principles (Gay 1978; but see Hattori 1965:542 for an appealing counter-argument). In other words, palatalization or fronting of consonants is held to be completely predictable before [i]. This does not hold before non-high vowels, however, and so where palatalization occurs in such an environment, it must be specified explicitly. The supposed /y/-glide employed in phonemic analyses of Japanese is defended in these terms.

I shall now argue, however, that in derivational models, certain clearly phonological, non-automatic processes must follow the particular case of regressive palatalization under consideration, which therefore cannot plausibly be interpreted as a *necessary* coarticulatory process.[6]

The self-feeding palatalization rule, (10), is simpler than the more restrictive self-bleeding (11).

11) Self-bleeding palatalization

$$C \rightarrow \begin{bmatrix} +high \\ -back \end{bmatrix} / \_\_ \overset{V}{\begin{bmatrix} +high \\ -back \end{bmatrix}}$$

(10) is also observationally more satisfactory, since it will correctly spread palatality to all preceding consonants. (11) would necessitate the operation of a further, later rule in order that immediately preceding consonants also become palatalized. But if a later rule is to apply, then (11) cannot possibly represent a 'mechanical'

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[6] Many striking examples of non-coarticulation could also be presented in defence of this claim.

coarticulation process, since such a process could only plausibly operate at the very end of a derivation.

Even if (10) is employed, it can still be argued that a later rule may operate. The description of the phenomenon given here is from a transformational fragment of Japanese phonology in Ueda (1976):

> "[i] and [u] normally disappear between a preceding voiceless consonant and a following voiceless consonant. This may be formulated as:
>
> 12)[7]
>
> $$\begin{matrix} V \\ [+high] \end{matrix} \rightarrow \emptyset \;/\; \begin{matrix} C \\ \begin{bmatrix} -voi \\ -nas \\ +cnt \end{bmatrix} \end{matrix} \;\_\_\; \begin{matrix} C \\ \begin{bmatrix} -voi \\ -nas \end{bmatrix} \end{matrix}$$
>
> Words like *Mississippi* 'Mississippi', *tukusi* 'horsetail' are thus pronounced [miʃʃppi], [tskuʃi]."

Further examples given by Ueda include *kisusi* [kisʃ] 'kissing', which demonstrates that the respective ordering of palatalisation (PAL) and high vowel deletion (HVD) must be:

/kisusi/ $\overset{\text{PAL}}{\Longrightarrow}$ kisuʃi $\overset{\text{HVD}}{\Longrightarrow}$ [kisʃ]

and not:

/kisusi/ $\overset{\text{HVD}}{\Longrightarrow}$ kiss $\Longrightarrow$?

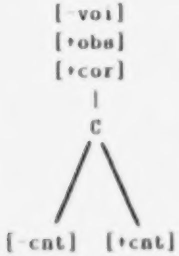
for in the latter case there is no following high front vowel to palatalize the final [s]. Again, if a phonological rule can be established which must follow palatalization, as Ueda's analysis suggests, then palatalization itself must be a bona fide phonological process, not merely an automatic coarticulatory artefact.[8]

---

[7] Similar attempts to formulate this rule appear in Ohso (1973), Hasegawa (1979a:127, 1979b:388) and Haraguchi (1984:147).

5 An Autosegmental Formulation

The problems of the SPE-type analysis might be attributed to the naïvety of its surface phonological representations. Given the nature of the phenomena under discussion, an Autosegmental analysis (Goldsmith 1976) might be more satisfactory than a transformational analysis. For instance, the canonical autosegmental treatment of affrication (Clements and Keyser 1983) unites the sequence of features [−*cnt*][+*cnt*] under a single C node, which itself bears a single matrix of features that encapsulates the homorganic articulation of an affricate. [ts], for example, can be represented in multilinear fashion along several simultaneous tiers (Prince 1984) as:



The values of the feature [*cnt*] are written on a tier below the C node, as they express sub-segmental information. Thus the feature

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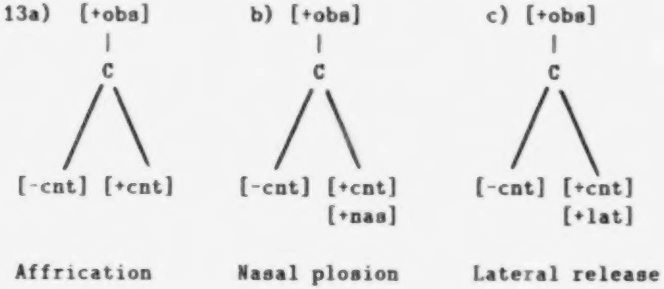
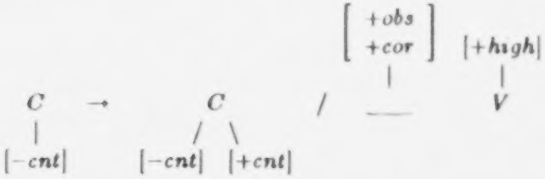
[8] Beckman and Shoji (1984) also notice that this ordering paradox presents a great problem for a derivational theory of phonological organisation, but they simply accept this as evidence that phonological rules may follow coarticulation "rules", rather than question the validity of derivational models.

[*del rel*] is obviated, and affricates are treated as paradigmatically unitary, but syntagmatically binary. The phonetic parallels between affricates and stops with nasal or lateral release is reflected in representations such as (13a–c):


13a)
[+obs]
C
[-cnt] [+cnt]
Affrication
b)
[+obs]
C
[-cnt] [+cnt]
[+nas]
Nasal plosion
c)
[+obs]
C
[-cnt] [+cnt]
[+lat]
Lateral release

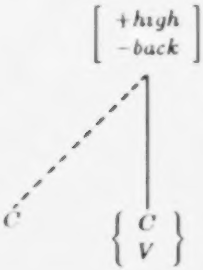
The affrication rule, reexpressed in autosegmental terms, is:

14) Affrication 4


+obs
+cor
[+high]
C
→
C
/
V
[−cnt]
[−cnt]
[+cnt]

(15) expresses the regressive association of palatality with consonants:

15) Regressive palatalization 1



(15) may apply over a sequence of consonants, just like (10). This example shows that Autosegmental Phonology allows more solutions than transformational phonology in cases of assimilation (but cf. Anderson 1982). Because it is constructed on transformational foundations, it may use copying rules (e.g. 10), or, alternatively, its own device, association rules (e.g. 15). (15) differs from (10) in employing autosegmental association, rather than copying. In uniplanar representation, association is more restrictive than copying, since it falls under the strictures of the WFC (see below for further discussion), and is consequently always locally bounded, whereas copying may be completely unbounded.

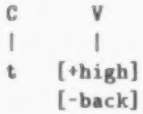
What, then, of the 'vowel elision' phenomenon reported by Ueda that results in such forms as [kisʃ]? How is the leftward spreading of palatalization blocked? The following structural restriction must be formally instantiated:

> *Palatality may extend as far back as the final consonant of a preceding syllable, but not so far as that syllable's initial consonant.*

An autosegmental analysis might propose that the constituents of a /Ci/ mora can be represented by two syllable terminals, labelled C and V. In [tʃi], the first of these is associated in lexical representations with the segmental matrix for [t], and the second with the matrix $\begin{bmatrix} +high \\ -back \end{bmatrix}$.

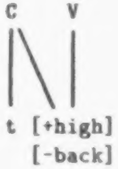
This does not settle whether C and V units or their features are to be represented on one tier, or on two independent tiers. I shall consider each of these possibilities in turn. With just two tiers — the CV tier and a segmental tier — the derivation proceeds as in 16a–d.

16a)



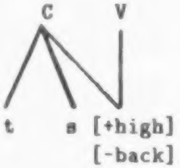
PALATALIZATION (15) ⇓

b)



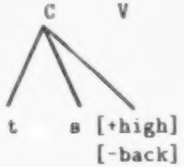
AFFRICATION (14) ⇓

c)



DEVOCALIZATION ⇓

d)

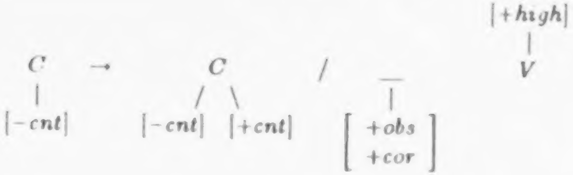


At this stage, in order for the fricative |s| to be associated to the floating V node (compensatory lengthening), the association line linking $\begin{bmatrix} +\mathit{high} \\ -\mathit{back} \end{bmatrix}$ with the C node must be 'swung out of the way', to ensure that it is not crossed by the association line between |s| and V.[9] The position of the V-features relative to the C-features on the diagram is unimportant, as long as they are associated with each other via the CV-tier. Observe how the derivation proceeds if the vocalic and consonantal features are set apart, on independent tiers. In (18) I have written the V-features above the CV tier, and the C-features below the CV tier. Since 'consonant' and 'vowel' features are not restricted to C and V slots respectively, and since they are not necessarily intercalated, but may co-occur, I term 'consonant' and 'vowel' features stricture and resonance features, accordingly. (The form of 14 will consequently be adjusted to:

---

[9] This constraint, known as one of the clauses of the Well-Formedness Constraint, or WFC (Goldsmith 1976:27), is usually taken to be of fundamental importance in restricting the range of permissible phonological representations. In Coleman and Local (1989), however, it is shown that the WFC follows as a necessary consequence of more fundamental graphical assumptions underlying Autosegmental Phonology. It is argued that the WFC is equivalent to a restriction on the embedding of graphs in planes, and has no place within linguistic theory. If autosegmental representations are limited entirely to graphs embedded in the plane, then the no-crossing condition is vacuous. But if 'three dimensional' representations (Halle and Vergnaud 1980; Archangeli 1985) are admitted, then the no-crossing condition ceases to restrict the range of possible representations, because any graph can be embedded without crossings in three-dimensional space (Wilson 1972), Pulleyblank's (1986:14) comments notwithstanding.

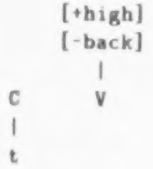
17) Affrication 5



$$\begin{array}{c}C\\ |\\ [-cnt]\end{array} \rightarrow \begin{array}{c}C\\ /\quad\backslash\\ [-cnt]\ \ [+cnt]\end{array} \Big/ \begin{array}{c}\_\_\\ |\\ \begin{bmatrix}+obs\\ +cor\end{bmatrix}\end{array} \begin{array}{c}[+high]\\ |\\ V\end{array}$$

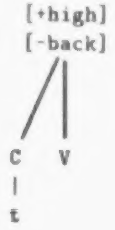
to accord with this decision.)

18a)



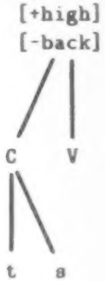
PALATALIZATION ⇓

b)



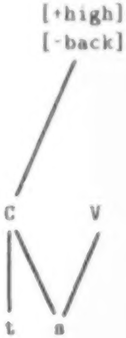
AFFRICATION ⇓

c)



DEVOCALIZATION AND
COMPENSATORY LENGTHENING ⇓

d)



Analysis (18) is clearly more satisfactory than analysis (16). In the multiplanar mode of representation, stricture (consonantal) and resonance (vocalic) features are represented on separate tiers: this allows such phenomena as 'vocalic colouring' of consonants, consonantal syllabics, and vowel-fricative alternation to be characterised with ease. The motivation for this decision was, however, to avoid violating the restriction that association lines may not cross. But if such a restriction is to carry any force, it should not be possible to subvert it by transferring any subgraphs whose association lines are likely to cross onto separate tiers or planes.

Many other problems can be avoided if statements of sequence are kept quite separate from statements of association of items in separate tiers. We have seen, for instance, that Japanese has CV, but not VC moras. In lexical representations, constant duplication of the information that C precedes V in CV moras is highly costly, since if a C and V are parts of one mora, it is completely predictable that their relative surface order is "C first, V second", as there are no VC moras. Where vowel-consonant sequences do occur, there is always a mora-boundary between the vowel and consonant, as that consonant either begins the next mora, or is a complete mora itself. The relative order of consonants and vowels within a mora is thus totally predictable, as is the location of mora-boundaries. Consequently, the most parsimonious analysis of Japanese is one in which consonants and vowels are grouped into moras, syllables etc., but not explicitly ordered.

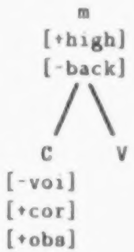
The informational content of linear precedence in phonological representations has to my knowledge never been discussed in Autosegmental phonology. It is just assumed that linear precedence in phonological or phonetic structure is represented by the order of printed items at no notational cost (cf. Cheng 1971).

6 A Prosodic-Structural Analysis

If stricture and resonance features are factored on to separate tiers, distinct C and V units may turn out to be unnecessary; that is, they may be susceptible to a configurational definition. In anticipation of this, let us now reconsider the phonotactic structure of the Japanese syllable. The syllable-structures I proposed in section 1 are rather different from the more usual pattern of Onset-Rime/Nucleus-Coda widely attested in other languages (and in Japanese too, according to Abe 1986). However, the Japanese pattern can be felicitously considered a stereoisomer of the more common case.

Employing a level of structure at which the mora is defined as an autonomous category, we can express tautomoraic palatalization simply by adding the "long-domain" or "prosodic" feature-cluster $\begin{bmatrix} +high \\ -back \end{bmatrix}$ to the mora node:

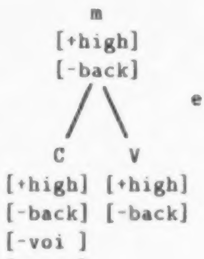
19)



e.g. /si/
/ti/

The idea is that such "factorized" features are common to both daughters in the manner of grammatical agreement features in syntactic theory. This could be achieved in the phonetic interpretation function, or by a feature inheritance mechanism:

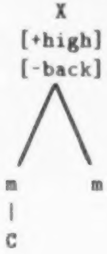
20)



e.g. /si/
/ti/

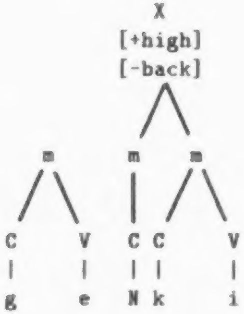
The 'spread of palatality' to a preceding consonantal mora could then be reformulated as (21).

21) **'Regressive' palatalization 2**



For example:

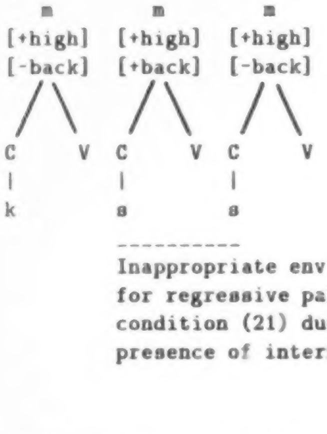
22)



The status of the node labelled X is at present unknown. It may turn out to be warranted as an autonomous prosodic category, or it may be that the domain of palatality represented in (21) is too limited, and needs to be extended to some more familiar domain, such as the foot. Alternatively, the Unification formalism offers the possibility that X is not a constituent node at all, but a reentrant (i.e. doubly-dominated) nonterminal node representing a category which is shared between two moras.

The spread of palatalization in [mattʃi] and [geɲki], and its absence in [kisʃ], is only correctly defined if Ueda's vowel deletion rule (12) is reformulated so that at least the V remains, ensuring that the mora still includes both C and V, and not just a C.

23)

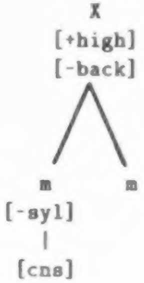


Inappropriate environment for regressive palatalization condition (21) due to remaining presence of internal V-unit.

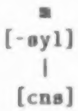
Phonological constituent structure can thus be used to set principled and motivated limits to the spread of palatality. When representations such as (19) are sanctioned, [rnd] too can be specified at the mora-level in Japanese, for its value can be specified for the whole mora. This removes the need for a further regressive assimilation rule, and, since all the vowel-features can be specified for entire moras, calls into question the need for CV elements on the timing tier at all. This proposition has been defended at length by Hyman (1985)[10], and now has some support both within Autosegmental Phonology (cf. Prince 1984) and in "rival" frameworks, notably Dependency Phonology (Anderson and Ewen (*eds.*) 1980; Anderson and Durand (*eds.*) 1988).

Such a development prohibits formulation of regressive palatalization as (21), which refers crucially to the presence of a single C-unit. A simple reformulation of (21), however, permits an adequate statement to be made:

24) Regressive palatalization 3



Mora consonants can thus be characterised as:



The former CV-mora structure is:

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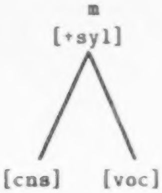
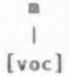
[10] Further support for the distinguished status of the mora as a phonological domain in Japanese is presented in Cheng (1971), Yoshiba (1981), Pierrehumbert and Beckman 1988:118–121, and Kubozono (1989).



with vowel- and consonant-quality features dominated by *m*. Former V-moras are now:



but with no consonantal features dominated by *m*. This reformulation also permits restrictions on the distribution of moras within words to be stated extremely simply, since $[+syl]$ moras may constitute a word, and may appear word-initially, whereas $[-syl]$ moras only ever occur after a $[+syl]$ mora. $\begin{bmatrix} -nas \\ -syl \end{bmatrix}$ moras, in addition, only ever occur before a $[+syl]$ mora i.e. between two $[+syl]$ moras.

Although it represents a departure from derivational phonology, the declarative nature of this analysis is extremely satisfying. There is no CV tier, and it is therefore a relatively more parsimonious analysis. Traditional vowel and consonant features are specified for the entire mora: that is, the secondary articulation of initial consonants derives not from regressive spreading of features from a vowel, but from 'vowel' features directly anchored in mora-tier units. This results in a more satisfactory analysis, achieved more simply, and with greater phonetic fidelity.

7 Sequence and Phasing

In the previous sections I discussed affrication and coarticulation informally in terms of a feature-based constituent-structure account of Japanese phonotactics. I proposed that each mora should be represented as an unlinearized structure of stricture and resonance features, and that phonological categories should be structured by suprasegmental phonotactic rules. These decisions have a number of important consequences:

i) Palatalization is not treated as a directed (regressive) assimilatory copying process.

ii) Fricative nuclei do not result from vowel-deletion.

iii) Sequence redundancies are removed from lexical representations.

I shall now show how whispered vowels and fricative nuclei can be incorporated into this framework.

The traditional claim that nucleus whispering or friction only occurs in voiceless/tense environments is not quite correct. On a number of occasions, I have observed nucleus whispering and friction before lax, voiced items. One example, which records nucleus friction in accelerated speech and whisper in slower speech, before a lax, voiced item in both cases, is given in (25). In this example, the first mora is accented (it is of greater intensity than the second mora, it is voiced, and may have a rising pitch-contour). It is more accurate, then, to state that nucleic whisper or friction occurs *more readily* before tense, voiceless items than lax, voiced items[11].

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[11] Similarly, although it is typically only high vowels which devoice, on occasions this phenomenon extends to mid vowels too, though rarely. It is clear that the tendency to devoice is accent-dependent, but as a full consideration of this matter lies beyond the scope of this paper, I shall continue to speak only of high vowels devoicing in voiceless environments.

25) It's an insect (mushi desu)

muʃ(i)dɛs
↑
complete fricative in faster speech

In all cases, however, nucleic friction or whisper only occur after tense, voiceless onsets in unaccented moras. The relationship between the voicing of a mora's onset and the possibility that its nucleus will also be voiceless is obviously not accidental, but neither is it simply a case of automatic assimilation, since it is accent-governed.

The traditional segmental analysis of whispered or devoiced vowels is predicated on the twin assumptions that i) vowels are by default voiced — that is, voiceless vowels are universally the exception rather than the norm; ii) voicing is specified segment-by-segment. By questioning both of these assumptions, I shall show that a more satisfactory analysis can be achieved.

Plain voicing is rather rare in Japanese. Shapiro's (1973) analysis, which accords with my own observations, proposes that 'tensity', and not 'voicing', is the primary paradigmatic distinction between 'tenues' and 'mediæ' in Japanese. Indeed, various other types of excitation, including aspiration, voiceless oral friction, pharyngeal friction, breathy voice, creaky voice and whisper are much commoner than simple voice or voicelessness. The so-called 'voiced' or 'lax' non-nasal onsets are actually only very rarely properly voiced; they are virtually restricted to accented moras, reduplication forms and other compounds; and they are specially marked in the orthography. Moras with voiced non-nasal onsets are written using the symbol for the mora with the corresponding voiceless onset, together with a mark called 'nigori'[12]. So 'ga' is written just like 'ka', but with the addition of the voicing diacritic. According to the assumptions presented in the previous paragraph, this is simply an irrational idiosyncracy of the Japanese writing system. But in fact 'nigori' can be viewed as marking not just the 'laxness' of the onset, but as also

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[12] A nominal form of the verb "nigoru", *to make muddy*.

encoding the information that the nucleus is never devoiced. Taken together, these facts suggest that 'voicing' operates in Japanese as a mora-domain (rather than a segmental-domain) feature; and b) 'voicing' is an exponent of accent. The normal state of affairs is:

Accented mora
/ \
Voiced onset voiced nucleus

Unaccented mora
/ \
Voiceless onset voiceless nucleus

In addition to these, there is also the 'marked' case:

Accented mora
/ \
Voiceless onset voiced nucleus

As in the orthography, then, I shall make the feature [*voi*] a mora-level feature, and specify not when vowels are devoiced, but rather when vowels in voiceless moras are exceptionally voiced.

Now I shall incorporate fricative nuclei into this analysis of voicing and accent. As with whispered vowels, rather than being an all-or-nothing assimilation phenomenon, the present analysis views fricative nuclei as one option in a tempo- and accent-dependent strength hierarchy:

Voiced vocalic nuclei	Accented
Whispered vocalic nuclei	Unaccented
Fricative nuclei	Unaccented/Accel. speech

This hierarchy is phonetically quite natural. In traditional articulatory terms, the distinction between fricatives and vowels is a difference in the degree of approximation of the active and passive articulators: close approximation in the case of fricatives, and open approximation in the case of vowels.

In the present analysis, moras will be represented as graphical structures (directed, acyclic graphs, or dags) whose nodes are sets of ordered pairs of features and their values. Two entirely equivalent forms for the representation of dags are used in the Unification formalism: tree-like unordered graphs (possibly with reentrant nodes), and feature-value structures. Both forms of diagram are used below. In lexical phonological structures, feature-values will be specified when not predictable, or unspecified when predictable: consequently only features with semantically distinctive function are included in representations of lexical phonological structure. Predictable features are not added in an incremental, procedural fashion to representations, but are incorporated in declarative fashion on the basis of satisfaction of constraints, such as defaults or implicational statements.

In lexical representations, each mora is a redundancy-free structure of distinctive features. In the commonest type of mora, CV-moras, each mora's feature-structure is partitioned into two substructures. One of these subsets contains the category-valued feature [*voc*], the other [*cns*]. In the case of consonantal moras i.e. moras of gemination, as in [mattʃi], or the nasal mora consonant, as in [geɲki], only the [*cns*] category-valued feature is lexically specified (regression of palatality may add *voc* features); in V-moras, only the category-value of [*voc*] is lexically specified. The features in the value of [*cns*] partially define distinctions in the stricture parameters of speech production, and are thus called stricture or obstruence features.[13].

This set of features includes specification of the place and degree of stricture, but not the "manner of articulation". The [*voc*] feature-structure is complementary to the [*cns*] feature-structure, in that its features partially define distinctions in the resonance parameters of speech production, and are called resonance features[14].

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[13] These features might equally well be called obstruction features (Griffen 1985) C-features or consonantal features.

[14] Similarly, resonance features might equally well be termed sonorance-, V- or vocalic features.

Phonotactic structures are represented using dags, which are rather like unordered trees, in order to export temporal ordering from lexical phonological representations. This is because surface moras in which an obstruence maximum precedes a resonance maximum, as in [tʃi], will be considered as exponents of the same abstract representation as the corresponding moras with fricative nuclei, such as [tʃː], in which the obstruence maximum occurs simultaneously with the resonance maximum. In the first case, the resonance and obstruence envelopes (i.e. contours) are out of phase, whereas in the second case they are in phase. The difference between the two exponents is thus a distinction of phasing, which is part of the relation which mediates between phonological and phonetic representations (Coleman and Local 1987 forthcoming, Kelly and Local 1989). Deletion is not, and need not be, invoked.

Certain features of the stricture and resonance feature subsets will be specified for the entire mora. In most Japanese moras, some of the resonance features in particular, fall into this class (cf. 19). In order to capture generalizations that are pertinent both to the stricture and resonance phases of a mora, the features used here are adopted from Jakobson, Fant and Halle (1952). In the main, the customary articulatory and acoustic interpretations of these features have been retained, although the presumption of their segmental nature has not. Furthermore, the greater structural richness of the current phonological framework obviates the need for some of the traditional features.

By way of example, I shall now present and discuss the representation of the mora with exponents (variously) [tʃi]~[tʃː].

The stricture feature [*cnt*] distinguishes partial from complete closure, or in other terms a long envelope from a short envelope. Long envelopes are characterized by the possibiity of being freely extended, subject to respiratory restrictions. Short envelopes, on the other hand, may not be extended. A non-continuant has a duration, albeit very brief, which has a much lower maximum upper limit than that of continuants. Although even complete closure can be freely maintained for relatively long periods, such articulations would in this analysis be characterised as continuants i.e. syllabic stops (cf. Hoard 1978).

The analysis of fricative nuclei rests on this interpretation of continuance. In the present example, [*cnt*] is used to distinguish the stricture phase of moras such as [tʃi] and [te] from [ʃi] and [se]. The set of resonance features is held to include [+*cnt*] by default. This is represented by a feature-specification default rule, FSD.

FSD: [*voc*] $\supset$ [+*cnt*]

The feature [*grv*] has been retained as it was felt to be well-motivated in a number of respects (cf. Campbell 1972):

1. It expresses a close relationship between backness and labiality that cuts across traditional primary distinctions of vowel and consonant.
2. It captures the close relationship that holds between front vowels and palatal and palatalized consonants.
3. It expresses the distributional relationships between nongrave and grave tense fricatives in Japanese.

These three points are exemplified in the discussions above, and are illustrated by the group of Japanese moras that are traditionally analysed as /ha/, /hi/, /hu/. Omitting much detail, these may be represented phonetically as:

/ha/: [ha] grave stricture, grave resonance.

/hi/: [çi] nongrave stricture, nongrave resonance.

/hu/: [Φu] grave stricture, grave resonance.

'Labial' and 'anterior' articulation is further distinguished by the [*cmp*] (compactness) feature, 'labial' articulation being [−*cmp*];

'anterior' articulation, [+*cmp*]. Compactness is also used to differentiate 'open' resonance, which is [+*cmp*], from 'nonopen' resonance, which is [−*cmp*]. [ha] is thus grave and compact throughout, whereas [Φu] is grave and noncompact throughout.

The naturalness of the compactness opposition is supported by the fact that items with noncompact resonance must be distinctively specified for the feature [*grv*] (i.e. backness vs. frontness). Gravity is not distinctive with compact resonance (i.e. /a/). Compact resonance is redundantly specified with the gravity of the associated stricture; compare grave [ha] and [ka] with nongrave [sæ] and [tæ], all of which are compact throughout.[15] Likewise, diffuseness is not distinctive in nongrave stricture (e.g. /t/, /s/), but instead the diffuseness of nongrave strictures is that of the associated resonance. This constraint can be represented by value-sharing:

$$\begin{bmatrix} cns: & \begin{bmatrix} grv: \boxed{1} \end{bmatrix} \\ voc: & \begin{bmatrix} cmp: + \\ grv: \boxed{1} \end{bmatrix} \end{bmatrix}$$

A simplified representation of the mora traditionally analysed as /ti/ is presented in (26)[16]. This representation does not include any specification for phonation or nasality, since I am only concentrating on 'palatalization' and affrication at the moment. Compactness, diffuseness and gravity are specified for the entire mora. (This will not, of course, be the case for *all* moras.) Continuance is not specified among the resonance features, since it can be predicted from the FSD.

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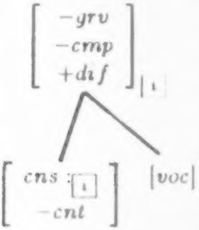
[15] To make his analysis more symmetrical, McCawley (1967) 'hypothesizes' a gravity opposition in compact vowels, and then justifies the validity of his hypothesis with a discussion about the history of the Japanese vowel system. In the present study, attention to phonetic detail obviates McCawley's hypothesis. Ironically, Keating and Huffman's (1984) study is so dependent on instrumental observation that this simple fact is not noticed.

[16] From here on, each example is complemented by an extensionally equivalent [feature: value] representation. The formal properties and principles of Unification Phonology will not be described however, other than through exemplification.

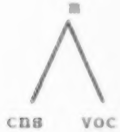
26)



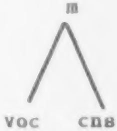
Compactness, diffuseness and gravity are closely associated, and in some sense codependent, since they all relate articulatorily to the displacement of the tongue and lower jaw. Vocalicity and continuance, however, are of a different order, since they relate to articulatory envelope in a way that gravity, compactness and diffuseness do not.

I shall not discuss the interdependence of gravity, compactness and diffuseness, but I will state that both stricture and resonance are dependent on their common features. This is represented by their whole-mora status in (26). $|voc|$ and $|cns|$ are not temporally ordered: (27a) is exactly equivalent to (27b).

27a)



b)



These graphs are equivalent representations of the feature-structure:

$$\begin{bmatrix} m : \begin{bmatrix} cns \\ voc \end{bmatrix} \end{bmatrix}$$

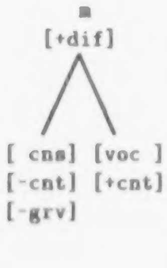
In a phonetically interpreted theory of phonology however, not only must constituent structure be modelled, but so also must the process by which unordered representations are 'given' temporal arrangement. This process can be seen to have a twofold aspect: rather than being simply the preparation of items for transmission along a single data stream, there are a number of parallel data streams. Ordering signals within individual streams is known as sequencing. The second aspect of queueing concerns the temporal relations, termed 'phasing relations', between signals in independent streams. Phasing relations determine coordination of the speech organs, and many disorders of speech production can be attributed to incorrectly acquired phasing. Unilinear catenative phonetics and phonology, which do not properly recognise phasing relations, are thus at a serious disadvantage regarding the diagnosis and rectification of such speech disorders.

Examples of ordering statements are (28) and (30). These include all that is needed to specify that a) in moras with both stricture and resonance phases, the stricture maximum never follows the resonance maximum, although it may precede and/or coincide with (i.e. co-start with) the resonance peak; and b) $\begin{bmatrix} -cnt \\ -grv \end{bmatrix}$ stricture is 'affricated' in $[+dif]$ moras.

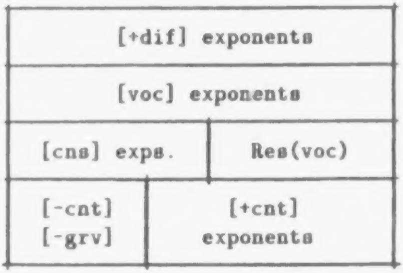
28) $[cns] \mid\!\!< [voc]$ ($\mid\!\!<$: 'co-starts with')

The temporal arrangement of the phonetic exponents of (29a), according to (28), is illustrated in (29b).

29a)



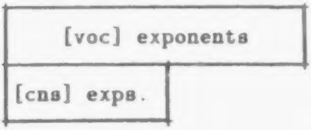
b)


[+dif] exponents
[voc] exponents
[cns] exps.
Res(voc)
[-cnt]
[-grv]
[+cnt]
exponents

Note that the nodes in (29a) are not linearly sequenced. This may seem odd, considering it is intended as a representation of a mora containing 'affrication'. But representing affrication in an unsequenced structure allows an explanation of the relationship between fricative-nucleus and vocalic-nucleus affricate-onset moras as a difference in phasing of the stricture and resonance envelopes. In vocalic nuclei, $|cns|$ costarts with $|voc|$ (i.e. $|cns|\,|\!\!<\,|voc|$), whereas for fricative nuclei $\begin{bmatrix} cns \\ -cnt \end{bmatrix}$ is coterminous (i.e. completely coincides) with $|voc|$ (30):

30) Phasing of stricture and resonance envelopes in affricated mora-onsets:

a) Vocalic nuclei: $|cns|\,|\!\!<\,|voc|$


[voc] exponents
[cns] exps.

b) Fricative nuclei: $[cns] \rightleftharpoons [voc]$ ('is coterminous with')

[voc] exponents
[cns] exponents

8 Concluding Remarks

Few of the components of the above analysis are new. For instance, in a short pedagogical exposition of Japanese pronunciation, Daniels (1958) made the following interesting observation:

> "consonants are said to be 'prefixed to' the vowels rather than to 'precede' them because ... in Japanese it is necessary to put the speech organs into the position for the vowel ... before producing the consonant — so far, that is to say, as it is possible to do this and still produce 'the consonant'. There is therefore more or less difference in almost all cases between the ways in which 'the same' consonant is produced when prefixed to different vowels."

The careful distinction which I have attempted to observe between the *order* of phonological units, their placement in structure, and physical *time* and *temporal sequence* in the phonetic interpretation of phonological representations derives directly from Firthian Prosodic Analysis. Carnochan (1957:158) spells out this distinction with particular clarity:

> It is perhaps appropriate to emphasise here that order and place in structure do not correlate with sequence in

> time, with reference to the experience of the text. The symbols with which a phonological structure is written appear on the page in a sequence; in ^{v}DE^{vh}Bə^{g}ry (Example 1, Masculine), structure of *jefaffe*, the symbol h precedes the symbol B, but one must guard against the assumption that the exponent of the element of structure h precedes the exponent of the element of structure B, in time in the pronunciation of *jefaffe*. There is no time in structure, there is no sequence in structure; time and sequence are with reference to the utterance, order and place are with reference to structure.

In the same volume, Firth (1957:5) reminds us that

> In these structures, one recognizes the place and order of the categories. This, however, is very different from the successivity of bits and pieces in a unidirectional time sequence

and a footnote directs us, in Firth's characteristically erudite manner, to Aristotle's *Organon*, Chapter VI! Firth (1948) makes a similar observation about the prosodies of Chinese monosyllables, and the nondistinctiveness of the order of C and V elements in Japanese:

> diacritica of the monosyllable are not considered as successive fractions or segments in any linear sense, or as distributed in separate measures of time.

A footnote to this statement refers to a paragraph from Joos (1948), which must have been published just before Firth's paper:

> In Japanese, if we neglect the geminates and the syllabic nasal, there is no structural significance in the order of

> phones in the typical syllable[17] *ka*. The typical syllable consists of a consonant (or zero) and a vowel, and these are always uttered in the order CV, but this order is of no consequence above the phonetic level. Correspondingly, the kana syllabary has a symbol which means *k* and also means *a*, but can be said to mean *ka* rather than *ak* only in consequence of the articulatory habit. ... And when a syllabary-keyboard Morse sender for radio telegraphy was designed for the Japanese armed forces, it is not surprising that it was built so as to send out the *a* signal of *ka* before the *k* signal: the order having no linguistic significance ...

Abstraction of features that pertain to complete phonological domains, rather than their distribution into individual segments, is a common principle of Firthian prosodic analysis (cf. Palmer 1970). The use of feature structures in prosodic analysis is novel, however, as is their interpretation.

Traditional Firthian prosodic analysis, although contributing much to the methodology of this study, suffers from a lack of uniformity in its formalism. Formulæ such as ${}^{y}\overline{TI}$, although intended to be noncatenative, still implicitly contain information about temporal order. 'T' and 'I', though not phonemic, nevertheless have catenative exponents. The same holds for structural templates of C and V units. Furthermore, 'T' and 'I' are still too obviously alphabetic for an analysis that claims to be completely abstract: they still call to mind 't' and 'i' more readily than, say, 'd' and 'u'. Most seriously, prosodic analysis offers no ready basis on which related and unrelated languages may be compared. And while it correctly recognizes the value of careful and detailed phonetic study, and only the utilitarian value of actual phonetic records, it largely failed to concern itself with the interface of phonology and speech production.

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[17] Joos means the unit which I call "mora", of course.

The relationship of transformational phonology to the psychological model of which it is supposedly a part has been similarly ambivalent. On the one hand, phonologists have concerned themselves with details of 'naturalness', 'formal expressive power', and so on, without much consideration of the physical phenomena which phonology attempts to model. So although in intent transformational phonology is a model of something that goes on in the brain, in most work there has been little or no mention of what mental processes or physical structures phonological theory models. Imagining surface phonetic representations to be not of physical events but of cognitive states — supposedly what a person 'knows' about the form of their speech — is highly pernicious, for in all works of transformational phonology, simple segmental phonetic 'records' of events are used to represent surface structure. This step has no justification; it's just that two meanings of 'surface' have been conveniently and systematically confused. On the one hand, 'surface' refers to cognitive states; on the other, to physical events. Although transformational phonologists rightly tackle the problem of characterising what speakers do and do not know about their language, it must also try to evaluate the status of phonologist's observational records in its methodology.

Unification phonology, on the other hand, has a number of distinct advantages. It has a relatively restrictive view of morphophonological organization: namely, there are two qualitatively different levels of representation, phonological and phonetic, related by an arbitrary mapping (denotation, or exponency). Phonological representations are structured, but unordered. The data discussed in this paper suggests that this position at least is exactly right. And formally-inclined phonologists can draw some comfort from the fact that the Unification formalism is computationaly tractable, mathematically elegant and extremely well-understood.

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CLAUSE STRUCTURE AND TONE IN SANDAWE

Edward D. Elderkin

1 Introduction

The use of tone within words is well documented. Tonal distinctions between words in sequence can often be analysed using the same devices as are applied within the word, for example downdrift or downstep. Sandawe[1], however, is a language in which the tonal relationships between constituents in clause structure, and between constituents in phrase structure, have a particular function, and sometimes a form which differs from that seen within a word. It is the intention of this paper to state in outline this phenomenon and some of its uses. Both constructed clauses and clauses from recorded oral texts are used to do this.

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[1] Sandawe is a Khoisan language spoken in central Tanzania. The languages to which it seems most closely related are those of the Central Khoisan group, of which Nama is the best known. Sandawe has been previously documented in several major works, for example, Dempwolff 1916, van de Kimmenade 1954 and the works of ten Raa (especially ten Raa 1967). My helper in investigating the Sandawe language was Nd Augustine Mathias, formerly of Mangastaa, to whom I record my thanks.

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2 Tone within words

The word, as used here, is a phonological unit defined by its phonetic realisation; it is not necessarily isomorphic with any syntactic unit. For example, the word in (1a) contains two morphemes, the second of which, sà, has its origin within the NP dominated by S, that is, within the subject; the morpheme d͡zìgídà does not belong to the constituent which is the subject of the clause.[2]

This paper does not provide a detailed syntactic analysis, but indicates the minimum syntactic analysis needed to appreciate the use of tone.

Sandawe has long and short vowels. In order to describe this, and the tone patterns which are seen in words, it is expedient to use the mora as the unit which both accounts for length (three to a long vowel and two to a short vowel) and chooses one of the two tones (high ´ or low `). There is downdrift between highs separated by one or more low moræ within one word. Downstep has been found between a syllable final high mora and a following syllable beginning with either a low toned mora or a high toned mora. Otherwise high tones within one word and without any intervening low tone maintain the same pitch level. The examples in (1) show these phenomena and the usual realisation of low tones in relation to a high. It will be noted that low tone on a syllable immediately following a high is phonetically raised, starting just below the end point of the preceding

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[2] The transcription which is used below is based on the principles of the IPA, with the following variations.

Voiceless unaspirated consonants are all given a subscript ̥ ; this doubly distinguishes them from the voiceless aspirated series which is shown by a following ʰ. I follow Beach 1938 in combining the three IPA symbols for clicks, ʇ, ʗ and ʖ, with the subscript tilde to indicate a click articulated with simultaneous voiced nasality: ʇ̰, ʗ̰ and ʖ̰. A full chart of those consonants well established in the language follows.

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[2] (cont.)

	clicks					nonclicks			
fricative				f		s	ɬ	x	h
glottalised	ʗ^{ʔ}	ʇ^{ʔ}	ʖ^{ʔ}			t͡s^{ʔ}	t͡ɬ^{ʔ}	k^{ʔ}	ʔ
aspirated	ʗ^{h}	ʇ^{h}	ʖ^{h}	p^{h}	t^{h}	t͡s^{h}		k^{h}	
voiceless	ʗ̥	ʇ̥	ʖ̥	p̥	t̥	t͡s̥	t͡ɬ̥	k̥	
voiced	ʗ	ʇ	ʖ̬	b	d	d͡z	d͡ɮ	g	
nasal	ʗ̰	ʇ̰	ʖ	m	n				
sonorant				w	r	j	l		

The symbol $_{ω}$ indicates labiovelarisation of the initial part of a syllable.

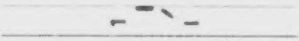
Small superscript symbols for nasals indicate a syllable final nasal element; in loan words, they, and the following homorganic consonant, often represent prenasalised units in the source language.

There are five vowels. Length is noted by a following ː. Some vowels are voiceless and are written with a subscript $_{\circ}$; in pitch diagrams, their presence is noted by the quaver rest symbol. After ʔ, the quality of a voiceless vowel is identical to that of the preceding vowel; here the vowel quality symbol is omitted, but the voicelessness and the tone are noted.

Tone marking follows the Africanist tradition: high ´, low `. The tone on the first mora of a syllable is noted; the tone on subsequent moræ is only noted where it is different from that on the first.

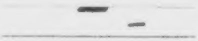
high, and then falling; otherwise, syllables with all low moræ are phonetically level, but lower following a high than preceding it.

(1a) Normal realisations of low



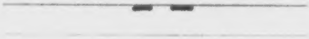
d͡zìgídàsà
d͡zìgídà sà
heart 3fSg
she . . . heart

(1b) Downstepped low



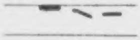
ʖˀá̄ːŋ!nà
ʖˀá̄ːkì nà
oo
above to
to above

(1c) Maintenance of High tones



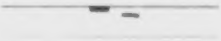
sóᵐbá
fish

(1d) Downdrift



t͡sˀámàsú
giraffe

(1e) Downstepped high



ɥ̥́ˈp̥ó

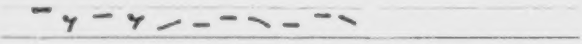
ɥ̥́	t͡sʰːì̥	p̥ó
come	NEG	2Sg

you didn't come

3 The noun phrase

In the structure of the noun phrase, sequences of coordinate words are characterised by the maintenance of the pitch of the first high tones in successive words. In (2a) k̥ìd͡zíd͡zī̀ː and hèwé are coordinate within the same NP; downdrift does not operate to lower the pitch on wé and the position of the word break is marked phonetically as the low tone on hè takes its pitch in relation to.that of wé, and not in relation to the d͡zí of the second syllable of the preceding word. Similarly the three words hăːẁ láʔ´m̥ū̀ː kʰùⁿdésè̄ː in (2b), have highs in the NP which share the same pitch level.

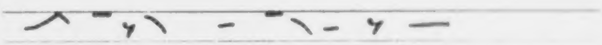
(2a)



t͡sˀéxì̥ t͡sˀḁ́ʔ̀ nĕː k̥ìd͡zíd͡zī̀ː hèwét̥à

t͡sˀéxì̥	t͡sˀí̥	ʔḁ̀	nĕː	k̥ìd͡zíd͡zī̀ː	hèwé	t̥à
one	LOC	3Pl	stay	the village	this	LOC

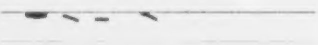
they lived together in this village

(2b)


hă:ẁ	lá?´mũ̀:	kʰùⁿdésȅ:gà?`		ƛ́:é
	o		o	
hă:ẁ	lá?´mũ̀:	kʰùⁿdésȅ:	?à	ƛ́:é
	o		o	
that	goat	who butted	3Pl	give him

and they gave him the goat which butted (the chicken)

Where downdrift operates within one of the coordinate words, it is the pitch level of the first high tone in this word that is shown by the first high tone in a following coordinate word. This is demonstrated by example (3).

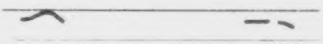
(3)


ts$^?$ámàsú	tê	
	o	
ts$^?$ámàsú	té	è
	o	
giraffe	another	3mSg

another giraffe

Although the evidence above suggests the generalisation that coordinate words within one NP have their high tones on the same pitch level, a small number of cases has been found where the head of an NP, preceded by a modifier, has a lower pitch than the modifier. An example is given in (4). Within the context of present-day Sandawe, this has to be considered exceptional, that is to say, I do not yet know what is the conditioning factor.

(4)

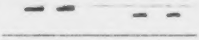


t͡sʰē̃ːː		léːbà
t͡sʰĕː	÷	léːbà
be absent	specific	Leeba
the late Leeba		

4 The associative construction

The associative construction is a constituent which functions as an NP. It has as its own constituents two NPs which are not coordinate; the second NP is the head. The meaning of the whole is often best translated as indicating possession. The second NP, the head, is realised with its first high tone lower than that of the first high tone in the first NP.

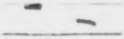
(5)



sáⁿdá	sóᵐbá
Sanda's	fish

The pitch interval is that of downstep, as can be seen by comparing (5) and (1e). But where the second word has only low tones, its first syllable has a downward glide, which is different from the realisation of a downstepped low; compare (6) and (1b).

(6)



t͡sí̥	ɓḛ̫̀
my	son

103

It would be possible to suggest that downstep between such words has a different realisation to that of downstep within a word, but the situation in clause structure suggests that another analysis is needed.

5 The basic clause

There are several types of clause structure. The one which is taken in the following examples is the basic clause structure. The basic clause structure is characterised by the presence of one morpheme from a series of morphemes which agree with the subject and may be suffixed to any constituent of the clause except the subject, or by the presence of the nominative morpheme -á: , suffixed to the subject; both may occur. A constituent to which one of these morphemes is suffixed is here called a marked constituent. Within one clause any number of marked constituents can in principle occur, but if the verb is marked, no other constituent may be marked. In the basic clause, the declarative marker gâ may appear in the marked constituent, immediately preceding the nominative morpheme or the subject pgn morpheme.

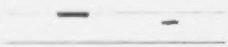
The morphemes which agree with the subject are referred to as pgn morphemes; pgn is an abbreviation for person, gender and number. This series of pgn morphemes I refer to as the subject pgn morpheme; they are listed in (7).

(7) Subject pgn morphemes

1Sg	sì̥
2Sg	ì
3mSg	à
3fSg	sà
1Pl	ò
2Pl	è
3Pl	ʔḁ̀

When the nominative morpheme -á: is used, the following constituent has a lower pitch, whether it is the verb, as in (8), or another NP, as in (9).

(8)



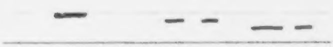
t̥͡sá: ɲ̥í

t̥͡sí á: ɲ̥í

1Sg NOM come

I came

(9)



t̥͡sá: sóᵐbá tʰí:mé

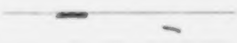
t̥͡sí á: sóᵐbá tʰí:mé

1Sg NOM fish cook it

I cooked the fish

In the example in (10), the word following the constituent with -á: is low toned; there is the same fall as has been illustrated with the associative construction in (6).

(10)



t̥͡sá: k̮ʰà

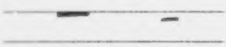
t̥͡sí á: k̮ʰà

1Sg NOM return

I came back

There are three problems associated with the idea of relating this lowering of tones to a downstep. The first has already been exemplified in the difference between (1b) and (10), and (1b) and (6); downstep within a word would here have a different realisation from downstep between words. The second is that this downstep is not present when there has been downstep, or a downdrift of high tones, within the previous word, as a comparison of the two examples in (11) shows.

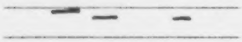
(11)



t͡sáː ʮ́
o o

t͡sí áː ʮ́
o o

1Sg NOM come
I came



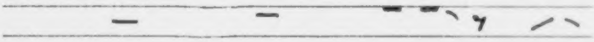
káːk ăː ʮ́
o o o

káːkà áː ʮ́
o o o

dog NOM come
the dog came

The third is that upstep would have to be recognised, as example (12) illustrates; the first three words all begin with a high tone.

(12)



síː ʮ̄́ː pʰíⁿdígòsì bǎːrà
o o

pu sì ː ʮ́ ː pʰíⁿdígò sì bǎːrà
o o o

& 1Sg NOM come and be busy 1Sg start
so I came and started to get on with it

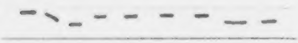
6 Marked constituents

The constituent to which the nominative suffix or one of the subject pgn morphemes is suffixed is here called the marked constituent.

Four possible clauses are given in (14), using just the four lexical items quoted in (13). The clauses all relate to the fact that Sanda cooked the fish yesterday. The favourite sequence of constituents is SOV. ʔút̥è is a member of a small system of temporals which behave alike.

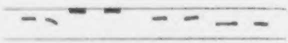
(13)	ʔút̥è	yesterday
	sá^{n}dá	Sanda
	só^{m}bá	fish
	t^{h}íːmé	cook

(14a)



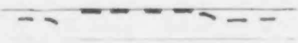
ʔút̥èsà sá^{n}dá só^{m}bá t^{h}íːmé

(14b)



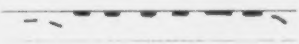
ʔút̥è sá^{n}dáː só^{m}bá t^{h}íːmé

(14c)



ʔút̥è sá^{n}dá só^{m}básà t^{h}íːmé

(14d)

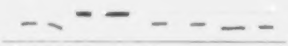


ʔút̥è sáⁿdá sóᵐbá tʰí:mésà

Any constituent which has either a suffixed subject pgn morpheme or the nominative morpheme always has the highest high pitch, irrespective of whether it is an NP, a verb or a temporal. Any NP preceding the marked constituent also has the highest high pitch. The high tone of a temporal preceding the marked constituent has a pitch lower than the highest high. An unmarked verb never appears before the first marked constituent in the clause.

I label by numbers the different pitch levels on which the first high tone in words is realised, using ^{1} for the highest. For example, clause (14b) would be transcribed as (15).

(14b)



ʔut̥è sáⁿdá: sóᵐbá tʰí:mé

(15) ^{2}ʔút̥è ^{1}sáⁿdá: ^{2}sóᵐbá ^{3}tʰí:mé

The pitch realisation of the tones in the examples in (14) can be accounted for by allocating to each constituent an underlying tone level and by stating two rules. The underlying tone level for NPs is 2 and the underlying tone level for temporals is 3. The first rule states that the marked constituent takes level 1 and any constituent preceding it is raised by one level. The second rule states that a downward skipping of levels, that is from 1 to 3, is eliminated by raising the level of the 3 to a level 2. So, for example, the derivation of (14b) and (14c) is given in (16) and (17).

(16)

	ʔút̥è	sá^{n}dá	só^{m}bá	t^{h}íːmé	
	Temp	Subj	Obj	Verb	
Underlying	3	2	2	3	
Mark subject:	-	áː	-	-	(Nominative)
Rule 1	2	1	-	-	
Rule 2	-	-	-	-	
Output (14b)	^{2}ʔút̥è	^{1}sá^{n}dáː	^{2}só^{m}bá	^{3}t^{h}íːmé	
	yesterday Sanda cooked the fish				

(17)

	ʔút̥è	sá^{n}dá	só^{m}bá	t^{h}íːmé	
	Temp	Subj	Obj	Verb	
Underlying	3	2	2	3	
Mark object	-	-	sà	-	(3fSg subject)
Rule 1	2	1	1	-	
Rule 2	-	-	-	2	
Output (14c)	^{2}ʔút̥è	^{1}sá^{n}dá	^{1}só^{m}básà	^{2}t^{h}íːmé	
	yesterday Sanda cooked the fish				

It would seem useful to assume that there are two types of structure, syntactic structure and discourse structure. The syntactic structure of all of the sentences in (14) is basically identical. The discourse structure decides which constituent is to be marked and this and the syntactic structure determine whether the nominative morpheme or the subject pgn suffix is chosen. The marked constituent is raised to the highest tone level; I shall refer to the meaning which is associated with a marked constituent as an information point.[3]

A syntactic clause does not have to have an information point.

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[3] If the marked constituent were always an information point then a case could be made for treating this as a syntactic phenomenon. But in one instance in the corpus I have transcribed, the marked constituent is not raised to the highest tone level. Lanki is being reproached for his failure to look after his senile mother and at one point he says:

In practice, however, most clauses will have at least one information point. It is possible for a clause to have more than one marked element, as example (18) shows; both ɬá:ʔ̥` and bàʔáwàsísṏ:sá: are information points.

(18) ^{1}ɓ̥óʔ̥` $^{2}$ʔá: $^{1}$ɬá:ʔ̥` ^{2}kʰàrìbíʃàñ́: ^{1}bàʔáwàsísṏ:sá:

ɓ̥óʔ̥`	p̥u	ʔà	!	ɬá:	ʔà	kʰàrìbíʃà	ñ́:
already	&	3Pl	NOM	good	3Pl	welcome	3Pl

bàʔáwàsísṏ:	sò	á:
the elders	3Pl	NOM

And the elders welcomed them well

In (18), ɓ̥óʔ̥` ʔá: ɬá:ʔ̥` kʰàrìbíʃàñ́: forms one unit of information and bàʔáwàsísṏ:sá: a second unit of information. Rules of tone level apply within an information unit.

---

^{2}s̫êsà

s̫ê	sà
now	3fSg

now she . . .

He wants to stave off the attack and keep the floor, but is still formulating what he is going to say. Inasmuch as the use of the suffixed subject has committed him to a particular subject, (and his audience will expect a statement to follow), he does have some idea of what is coming, and of who the subject of the clause will be, but he has no idea as to what will be the main information point. He may conveniently pause in the hope that the expectation of an assertion and a verb will deter a further onslaught. This example shows why syntactic phenomena should be kept separate from the question of how the information in a clause is organised.

7 The narrative clause

Clauses which use the basic clause structure may also show the conjunction p̥u, as has occurred in (18). The p̥u is always suffixed with the subject pgn morpheme, and the resulting word, which is referred to as the narrative conjunction, always has a high tone[4] The forms in (19) result, where it is seen that when the following subject pgn morpheme has an initial consonant, there is no segmental trace of p̥u. These narrative conjunctions appear at or near the beginning of the clause.

(19) Narrative conjunction

1Sg	sí:
2Sg	p̥í:
3mSg	k̥̫á or p̥á:
3fSg	sá:
1Pl	p̥ó:
2Pl	p̥é:
3Pl	?á:

These have an underlying tone level 3, but they do not always submit to raising before a level 1 in the same clause; I have not been able to determine any reason for this variation and as yet I consider it to be free variation.

The narrarive conjunction is a marked constituent, but is is never chosen as an information point. As noted earlier, within one clause any number of marked constituents can in principle occur, but if the verb is marked, no other constituent may be marked. If the verb in a clause with a narrative conjunction is chosen as the information point, then it is raised to level 1 without being marked, and, in the examples I have, immediately follows the narrative conjunction

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[4] I did not record p̥u in field work and take it from ten Raa's work; I do not know its tone. In order to account for the high tone on the narrative conjunction, perhaps that conjunction also contains a high tone as an allomorph of the nominative morpheme, as analysed in examples in the text, but I have no evidence to support this conjecture.

(20) ³k̥̫á ¹ɓ̥àt̥ á ²láːʔè

p̥u à [illegible] ɓ̥àt̥ á láːʔè
& 3mSg NOM be satisfied hare
and the hare had had enough

8 The copular clause

The copular clause consists of two noun phrases with no copula.

(21) $NP_1 + NP_2$

One NP will usually be an information point and as both are coordinate within the clause, both usually appear on tone level 1.

(22) ¹t̥sí ¹láːs̥i

t̥sí láː s̥i
1Sg good 1Sg
I'm well

A sequence such as that in (22) could also be taken as two coordinate constituents of an NP; when this construction is used as a copula clause, it is most usual for the declarative marker gâ to be used followed by ʔ̥á, used as a 3Sg pgn form, which agrees with the whole clause and which asserts its status as a clause.

Under certain conditions, not detailed here, nominals take a pgn suffix which indicates their person, number and gender, and I refer to these as nominal pgn morphemes. The final sì̥ in (22) is such a morpheme. These nominal pgn morphemes form a different series from the subject pgn morphemes; the nominal pgn series with a low tone is listed in (23).

(23) Nominal pgn morphemes, low toned

1Sg	sì̥
2Sg	p̥ò
3mSg	Ø/m̀/ẁ/è
3fSg	sù̥
1Pl	sū̀:
2Pl	sī̀:
3Pl	sò

The copular clause forms the base for other clause types, including the irrealis and the -sí clause.

9 The irrealis clause

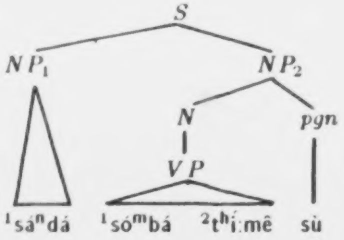
One use of the irrealis clause is as a future tense; the future will be used in this section. At first glance, a future clause looks similar to a basic clause, in that the favourite sequence of constituents is SOV.

(24) ^{1}sá^{n}dá ^{1}só^{m}básà ^{2}t^{h}í:mêsù̥

Sanda'll cook the fish

But there are differences. Although it has not been illustrated above, the basic clause allows variation in word order; less is possible with the future. The pgn suffix of the future always appears on the verb, and it may not appear anywhere else. The pgn suffix on the basic clause belongs to that suffixed subject series stated in (7), that in the future belongs to the nominal series stated in (23). In the basic clause, a declarative morpheme gâ can appear on any constituent, which will then be the marked constituent, and the gâ will be followed by the pgn of the suffixed subject series or by the nominative morpheme. In the future, the declarative morpheme can appear on the subject, where it will be followed by a pgn of the nominal series, agreeing with the subject, and it may follow the verb, in which case it also follows the nominal pgn which is suffixed to the verb, and gâ itself has the suffix ʔḁ̀, used as described in the previous section. gâ cannot follow the object. The fact that it cannot follow the object seems to indicate that the sequence object and verb is itself a clause constituent in the future, and the use of the nominal series of pgn suffixes with it seems to show that the underlying structure is that of a copular clause, as is shown in (25).

(25)



sáⁿdá sóᵐbá tʰí:mé sù̥

Sanda fish cook 3fSg

'Sanda'll cook the fish'

In such a structure, both the NP_1 and the NP_2 would be expected to have the same tone level. However, when there is no object in the VP which is dominated by NP_2, the NP_1 can be made an information point by using the system of tone levels, as can be done in the basic clause. The examples in (26) compare basic and future clauses.

(26)	^{1}gélé ^{1}máʔʔ̀:	^{1}gélé ^{1}máʔà:
	Gele will be tired	Gele was tired
	^{1}gélé ^{2}máʔʔ̀:	^{1}gélá: ^{2}máʔ̥̀
	It's Gele who'll be tired	It's Gele who was tired

But if there is an overt subject, and an overt object present in the VP, this use of tone levels to make an information point is not possible. The reason is clearly one of interpretation strategy: to have the subject NP one tone level higher than the following NP which is the object of the verb, would produce a tonal relationship between them which would be interpreted as two NPs in an associative construction.

10 Clauses with sí

sí can be suffixed to both noun and verb stems. It is followed by a nominal pgn suffix and it can be taken that a form which has this sí is a nominal form. Its range of translation equivalents can be seen in (27).

(27)	mḁ́tósísì̥	'I've a gourd'
	tʰímésísì̥	'I can cook' (imperfective verb stem)
	tʰí:mésísì̥	'I managed to cook it' (perfective verb stem)

Although the translations in (27) have been by English verbal clauses it seems that each of the Sandawe words, as a nominal, is the NP_2 of a copular clause.

The clause in (28) has the structure of a copular clause, the NP_2 consists of ^{1}sóᵐbá ^{2}tʰímésísù̥.[5]

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[5] This form is usually heard as tʰímésúsù̥, but the sí is retained in the text for

(28) ^{1}sáⁿdá ^{1}sóᵐbá ^{2}tʰímésísù̥

Sanda is a person who knows how to cook fish

But there is also the possibility of the clause in (29), which is much more likely to occur.

(29) ^{1}sáⁿdá ^{1}sóᵐbá ^{1}tʰímésísù̥

Sanda knows how to cook fish

In order to distinguish between a copular clause and a more verbal clause, Sandawe has innovated a clause type by allocating the verb also to the same level as the object. As an NP with sí is a very common form used as a modifier, the innovation of this new clause type serves as a clear indicator that the whole functions as a clause. In example (30), the last two words are an NP, 'the man who has taken Ignatia'; the pitch relationship between the two constituents is one cue to its status as an NP. Example (31) is a clause; the verb appears on tone level 1.

(30)

^{1}ʔ̰èmésé: ^{1}kó̥:sè ^{1}ǂɲȁ:sà ^{2}siésúsȅ:

ʔ̰èmésé:	kó̥:sè	ǂɲȁ:sà	sié	sú	sí	è	÷
man	exist	Ignatia	take	3fSg	sí	3mSg	specific

somebody has married Ignatia

(31) ^{1}ʗ̥̰ȁ`: ^{1}hèwé ^{1}mànàsísì̥

ʗ̥̰ȁ:	÷	hèwé	mànà	sí	sì̥
place	specific	that	know	sí	1Sg

I know that place

---

clarity

11 History

An earlier study, (Elderkin 1986), using internal reconstruction and comparison with Nama, suggested that it seems likely that the origin of the difference of tone level between an NP and a verb is to be found in the loss of a suffix final to the NP. The use of tone level 1 on a marked item, one used as an information point, seems to be attributable variously to the loss of such a suffix, to the low tone on the suffixed subject pgn series and also to the possibility that an information point intrinsically carries a raised tone to give it the prominence it requires; examples (20) and (26) suggest this. Once established in the language, the system has been extended beyond its historical limits in the adaptation of what are historically copular clauses to a more verbal nature, but only to the extent that no conflict with preexisting structures in the language is created.

The decription of Nama given in Haacke[6] 1976 shows some forceful parallels to these phenomena of Sandawe. Radical lexical formatives, that is, those which are not compounds, have one of six tonemes. Each toneme had two alloforms which Haacke refers to as basic and perturbed. The perturbed profile, as well as being distinguished by a different pitch pattern from the basic profile, is also lower in pitch. Haacke shows that within a phrase, whether NP or VP, the first lexical item has the basic profile and subsequent lexical items have the perturbed profile. In the VP in Nama and Sandawe the NP precedes the V. So in Nama, the lexical item in that NP has the basic profile and the lexical item in the V has the perturbed profile. This corresponds well to the underlying level 2 on the NP and the underlying level 3 on the V in Sandawe. In Nama, the verb can be marked, in the sense used above, but with a greater number of morpheme classes than in Sandawe. When so marked, it takes the basic profile; a marked verb in Sandawe takes tone level 1. In the associative construction, the basic profile on the first noun is followed by the perturbed profile on the head noun; Sandawe has the head noun one tone level below that of the first noun.

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[6] I acknowledge with gratitude the kindness of W. H. G. Haacke in allowing me sight of his theses; in the interests of consistency, I interpret his data in conformity with the description of Sandawe which I have given here, and I alone should be brought to task for any infelicities and inaccuracies which this interpretation brings.

I have referred to NPs in Sandawe both as clause constituents and as phrase constituents. In Nama within an NP as such a constituent, more than one basic profile may occur. Where there is thus more than one basic profile, each basic profile is the initial lexical item of an NP coordinated within that constituent. When within such an NP a modifier precedes the head, the expected sequence of tone profiles, basic followed by perturbed, is the rule. So it seems that the Sandawe tone pattern in example (4), which was treated above as an exceptional pattern, is historically that of an NP. The general rule in Sandawe that words within an NP share the same tonal level, derives from the time when each such word constituted an NP in its own right. I do not think that the structure of Sandawe is such as to allow this as a synchronic interpretation, although in Nama it is possible.

In short, the relation in Nama between a basic profile and the following perturbed profile is comparable to the relationship between a word on underlying tone level 2 and the following word on an underlying tone level 3 in Sandawe. There are several places where the structure of Sandawe and the structure of the Central Khoisan languages, of which Nama is one, correspond. It seems that the way in which they use tone in clause structure is one such feature.

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TONE AND ACCENT IN THE QAFAR NOUN

R. J. Hayward

This paper comes as a sequel to an analysis of tone and accent which was presented rather briefly in the Grammatical Notes appended to Parker and Hayward (1985). While the present paper does furnish some justification for and further illustrations of the earlier analysis, it also sets out to modify it with respect to one particular point, namely, the relationship between accent and gender. The revision of this point has important implications, both synchronic and diachronic.

I believe that the new proposal makes for a simpler account of gender in that (for Qafar) this category is seen as determined rather than determining, which further suggests a line of explanation for how gender might be acquired by speakers of this language. In this, the present approach is in line with more recent work on gender in Qafar (Hayward and Corbett, 1988). The re-analysis also makes good sense for comparative work, for it assumes that Qafar and Irob Saho can be analysed as having a common accentual system, and that the major difference between the two concerns only the rule of High Tone Association.

Both in the 1985 analysis and here, it is claimed that, like other members of the East Cushitic group, the Qafar-Saho languages display tonal accent rather than stress accent. But the evidence

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for this claim is far less obvious in the case of Qafar-Saho than in the cases of Somali (Hyman 1981; Banti, forthcoming), Oromo (Banti, forthcoming), Arbore (Hayward, 1984) or Rendille (Pillinger, 1988), for there has been an appreciable development of sentence prosody (intonation) in Qafar-Saho, and it may well be the case that the languages/dialects of this group are very close to a typological watershed.[1] Justification for the decision to treat the relation between pitch variation and prominence in the Qafar-Saho group as tonal accent is the subject of a paper currently in preparation, and here I simply assume that this term is appropriate.

I shall start with a review of the original analysis proposed in Parker and Hayward (1985: 218ff). In that account, accent and tone are distinguished in the following way. Accent is defined as an abstract marker of the potentiality for an association between a particular syllable[2] and a high tone. Accent is said to be either lexical or assigned by rules sensitive to certain morphosyntactic categories. Following the practice of Goldsmith (1976, 1982) and other phonologists working within the Autosegmental framework, accent, whether inherent or assigned, is indicated by means of an asterisk above the relevant vowel letter in the transcription. The term 'high tone' refers to a feature of (relatively) higher pitch which is associated with one particular syllable in the first word in a phrase. High tone is symbolised in phonological representations as H, and indicated in the transcription of examples by means of a grave accent. Syllables not associated with high tone generally have low pitch.[3]

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[1] It should be noted that previous investigators have generally dealt with pitch prominence in Qafar and Saho as 'stress' (cf., for example, Welmers, 1952; Morin, 1977, Bliese, 1981). One reason for preferring an analysis in terms of tone and accent is that pitch contours associated with an intonational function in Qafar and Saho operate very largely in independence of accent and the high tone element of the tonal system, which is discussed in the paper.

[2] The term 'syllable' is used in an informal way as an abbreviation for referring to the 'nucleus of a syllable'. Whether this is the appropriate tone-bearing unit for Qafar, or whether we ought to invoke the 'mora', is itself a matter for debate. Without entering into a detailed justification for the decision here, I have opted for the former analysis.

[3] This statement requires qualification. The description in Parker and Hayward (1985: 222ff) makes it clear that Qafar has certain larger-domain phono-

As stated earlier, the domain of high tone is a unit which, for convenience, we may refer to as a 'phrase', since, in general, it is congruent with a syntactic constituent of that order. This is especially obvious in the case of noun phrases and postpositional phrases. However many words there are in a NP (or PP), high tone is only associated with one syllable, and this is always located in the first word of the phrase. Furthermore, within this first word, high tone can only ever be associated with one of the last three syllables. These statements are exemplified in 1–4. (In the examples, parenthesized material belongs to a phrase other than the one under consideration.)[4]

1. (a) *sagà (rabteh)*
   (a) cow (died)

   (b) *woò saga (rabteh)*
   that cow (died)

   (c) *sidicà saga (rabteh)*
   three cows died

   (d) *woò sidica saga (rabteh)*
   those three cows (died)

   (e) *qadò saga (rabteh)*
   (a) white cow (died)

   (f) *sidicà qado saga (rabteh)*
   three white cows (died)

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logical elements which we might appropriately regard as intonation. Such 'sentence prosodies' comprise segmental components which do not fit into the consonant and vowel systems of the language; they also comprise pitch features not analysable in terms of the tonal system considered in this paper. Moreover, rather than speaking of 'low tone', it seems preferable to say that the relatively low pitch feature of syllables not associated with high tone results from a late default assignment of pitch values.

[4] The spelling of Qafar forms is in accordance with the recently adopted orthography. (For a discussion of this, the reader is referred to Parker and Hayward, 1985: 5–7). In this orthography, the only letters requiring comment are *q*, *c*, and *x*, which represent a voiced pharyngeal fricative, a voiceless pharyngeal fricative, and a voiced retroflex plosive respectively. Long consonants and vowels are represented with double letters.

2. (a) *awki (gufeh)*
a boy (arrived)

(b) *taamitak yen awki (gufeh)*
(the) boy who was working (arrived)

3. *yi bazıh kataysıh ına (gufteh)*
my son's friend's mother (arrived)

4. (a) *darò yokmeh suge hantuuta tıggıfe dummu dıırıye kutı (àh kaa)*
grain he-had-eaten rat she-killed cat he chased dog (this is him)
(this is) the dog that chased the cat that killed the rat that had eaten the grain

(b) *kuti dummù (dıırıyeh)*
(the) dog (chased) (the) cat

(c) *dummù darò yokmeh sugeh hantuuta (tıggıfeh)*
cat grain he-had-eaten rat (killed)
(the) cat (killed) (the) rat that had eaten (the) grain

In order to predict which syllable of the first word high tone will be associated with, accent has to be taken into account. The association operates according to the rule given in 5.

5. *High Tone Association (NPs and PPs)*

If the first word contains an accented syllable, H will associate with that syllable. Otherwise, H will associate with the final syllable of the first word.

The rule assumes that only some words are accented, though provided it appeared in the appropriate syntactic configuration, any word could have the high tone associated with it. The rule accounts for the differences in location of the high tone in pairs of phrases such as the following.

6. (a) *k*$\overset{\overset{H}{|}}{\overset{*}{\textit{u}}}$*ta (màfaxa)*
(I don't like) dog(s)

(b) $\overset{\overset{H}{|}}{\textit{a}}$ *k*$\overset{*}{\textit{u}}$*ta (màfaxa)*
(I don't like) this dog

7. (a) *dumm*$\overset{\overset{H}{|}}{\textit{u}}$ *(màfaxa)*
(I don't like) cat(s)

(b) $\overset{\overset{H}{|}}{\textit{a}}$ *dummu (màfaxa)*
(I don't like) this cat

While phrasal high tone always associates with the first word of a phrase, which syllable it associates with depends upon whether or not the word is accented, and if it is, upon which syllable the accent is located. Thus, *k*$\overset{*}{\textit{u}}$*ta* 'dog' in 6 is accented on the penultimate symbol, *dummu* 'cat' in 7 is unaccented.

In our original treatment, the assignment of accent distinguishes two cases: (i) the case of nouns to which accent is assigned in virtue of morphological and morpho-syntactic categories such as 'root', 'gender' and 'case'; (ii) the case of nouns where the accent cannot be assigned by such means. For the first situation, the following rule was given.

> 8. Accent is assigned to the final root syllable of the absolutive form[5] of a masculine noun, unless that noun carries lexical accent.

This rule accounts for the majority of nouns ending in consonants (virtually all are masculine) and all vowel-final masculine nouns. The final vowel in the latter group, although lexically determined, is not reckoned as part of the root, since it is replaced by any vocalic case marker.[6] Examples of nouns receiving accent in this way are given in 9.

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[5] The absolutive form may be regarded as the unmarked form of a noun. It is identical to the citation form for all V-final nouns. But this identity does not obtain for C-final nouns. From the point of view of syntax, citation forms in Qafar are predicative complements, and in this function C-final nouns take a copular element which in the pronounced word consists simply of a vowel harmonising with respect to features of roundness and lowness inherent in the last stem vowel. e.g.

absolutive form	citation form	
càn	*càna*	milk
dagìb	*dagìbi*	marriage
debèn	*debène*	beard
bùn	*bùnu*	coffee
moyndòb	*moyndòbu*	stud animal

Nevertheless, the phonological shape of the absolutive form of a C-final noun is essentially an abstraction, for although it occurs in direct object function with no additional element affixed to it, the very fact of its being C-final may bring about a process of closed syllable contraction, which neutralizes vowel length in the final syllable. Any underlying quantity distinction is only revealed when a vowel-initial element is attached. This occurs, for example, in the following citation forms.

absolutive form	citation form	
lubàk	*lubàaka*	lion
daqàr	*daqàara*	wadi
dùl	*dùulu*	hippopotamus

[6] For example.

9. (a) C-final: *ċan* milk

danȧn donkey

maymaqu̇t making peace, repairing

mukaalafu̇t breach, violation

(b) V-final: *gu̇ra* left hand

faku̇yna

makaabȧnna wisdom, sagacity

keemaariṫiyya dissension

Masculine nouns not receiving the accent by this rule are regarded as having lexical accent. Such nouns are a minority; they are all consonant-final and are accented on the penultimate syllable of the root. e.g.

10.	*qȧday*	tree species
	baȧker	greed
	munku̇zuz	insomnia
	eddehȧysit	defendant

All remaining nouns are vowel-final and feminine in gender, and, according to our analysis, are unaccented. e.g.

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	absolutive	nominative	genitive 1	genitive 2
boy	awka	awki	awkì	awkih
children	urru	urri	urri	urrih
house	qari	qari	qari	qarih

11.	*buza*	house
	kontayto	tree species
	kanaanaho	hearty laughter
	mankanaanaca	getting up (of a fire)

At this point I should like to introduce a slightly different analysis. Gender is extremely important in Qafar; it has, for example, consequences in terms of verb agreement, e.g.

12.	*kuti rabeh*	vs.	*dummú rabteh*
	(the) dog(m.) died		(the) cat(f.) died

As the account given above makes clear, there is a strong correlation between phonological factors and gender in this language. Our 1985 account operates on the assumption that gender, being a largely arbitrary categorization of nouns from a semantic point of view, has to be entered at the deepest lexical level; thus, it is available as a determinant for a rule such as that given in 8 for accent. While this approach is adequate for descriptive purposes, it contains redundancies, and, more significantly, it fails to address the problem faced by language learners acquiring nominal gender. Addressing this question leads one to conclude that the correlation of phonology with gender must be exploited. The ability to read gender off phonetic forms could be achieved in two possible ways. It would, for example, be possible to deduce feminine gender on the basis of the fact that citation forms of vowel-final nouns had high tone on the final syllable; all other nouns would then be masculine. An alternative strategy would then be to deduce masculine gender on the basis of a citation form of a noun being either consonant-final or having high tone on some syllable other than the final one; all other nouns then being feminine. Of course, neither strategy necessarily excludes the other. But in any event, it should be clear that gender will not be available for assigning accent as stated in 8. Accent is, however, still necessary, for no strategy can avoid the need to distinguish in some way certain subsets of nouns the citation forms of which never bear high tone on a final syllable, and thereby constitute the 'special case' for high tone asssociation (cf. 5) and furnish the basis for employing the accentual diacritic.

In the 1985 account we subdivided masculine nouns in the following way.

13.

	C/V-final	syllable bearing H	treatment
group 1	C-final	penult	accented lexically
group 2	C-final	ultima	assigned accent by rule 8
	V-final	penult	

(It will be recalled that the two types of group 2 were united by reference to a morphological entity, viz. the root, the final syllable of which was assigned accent.) Under this analysis, all masculine nouns are accented.

A more parsimonious and more insightful analysis may be achieved on the basis of 14.

14.

	C/V-final	syllable bearing H	treatment
group 1	C-final	penult	accented lexically
	V-final	penult	
group 2	C-final	ultima	unaccented

The differences are, I believe, quite significant. Rule 8 is no longer needed, thereby leaving us free to regard gender as derivative, rather than primitive. Another difference is that the set of unaccented nouns (i.e., nouns that bear phrasal high tone via the default clause of 5) is greatly increased, for the majority of C-final nouns (illustrated in 9(a)) will be added to this set. This is also significant, for the class of unaccented words also includes every possible type of nominal modifier. Qafar is a strict S-O-V, i.e., head-final, language, and every type of NP specifier or complement precedes the head, and all of them achieve association with the phrasal high tone by means of the default clause of 5. Thus, the reanalysis of the majority of consonant-final nouns as unaccented drastically reduces the number of exceptions to the general rule. It is, perhaps, a further advantage of this analysis that it isolates all exceptions to the general rule in one place, namely, the lexicon.

To this point my account of nouns has been confined to a consideration of their appearances in absolutive case. Like most Cushitic and Omotic languages, Qafar is what I have elsewhere termed a 'nominative' language (Hayward, 1988). The defining characteristics of such languages are: (i) a marked (nominative) case form for a noun as head of a subject NP vs. an unmarked (absolutive) case form for a noun as head of any complement NP (including direct object function); (ii) identical morphological behaviour for subjects of intransitive as well as transitive verbs. The first feature sets such languages apart from 'accusative' languages like Latin, Greek, German, Amharic, etc., which have at least some marked accusative forms. The second feature separates this type from 'ergative' languages such as Basque, Eskimo, etc., in which only the subjects of transitive verbs take nominative marking. In Qafar, overt segmental nominative marking is confined to V-final masculine nouns, and consists in a substitution of a nominative case inflection *-i* for the final vowel. From the point of view of the present analysis of high tone association, nominative marking is probably best described as bringing about accentual suppression (or deletion), for the resultant form bears high tone finally, providing it is not preceded by any other word(s) in its phrase, i.e., it is a form which can be accounted for by an appeal to the default clause of 5. e.g.

15. (a) *kuti hantuúta yiggifeh*
(a) dog killed (a) rat

(b) *hantuuti kúta yiggifeh*
(a) rat killed a dog

However, it is not affixation of the nominative suffix *-i* that effects this so much as the syntactic configuration itself that triggers accentual suppression, for the same behaviour with regard to high tone association is witnessed in what have been analysed as accented consonant-final nouns, e.g.

16. (a) *kuti àqan yubleh*
(a) dog saw a frog   cf. *k*$\overset{*}{u}$*ta* (m.abs.)

(b) *aqàn kùta yubleh*
(a) frog saw a dog   cf. $\overset{*}{a}$*qan* (m.abs.)

Similar behaviour is observed in genitive constructions, where accent is suppressed in the possessor noun whether or not any overt segmental genitive marking occurs. e.g.

17. (a) *kuti xagor*
dog's fur

(b) *à kutih xagor*[7]
this dog's fur

The reason why in our earlier analysis we did not group together C-final and V-final nouns in which H associates with the ultimate syllable (i.e., why we posited the analysis of 13, rather than that of 14) rested upon what appears to be differential behaviour exhibited by these two classes of items when functioning as complements of postpositions. If, for example, we compare the behaviour of C-final (masculine) nouns such as *càn* 'milk' or *danàn* 'donkey' with that of the two types (masculine and feminine) of V-final noun in postpositional phrases, we observe that the masculine nouns appear to pattern in the same way. e.g.

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[7] It is to be noted that genitive marking in Qafar-Saho languages differs according to whether the possessor NP is expanded or not; cf. the forms in Note 6.

18. (a) *cànal*
in milk cf. *càn* (m.abs.)

(b) *danànak*
from (a) donkey cf. *danàn* (m.abs.)

(c) *qàril*
in (a) house cf. *qàri* (m.abs.)

(d) *kùtak*
from (a) dog cf. *kùta* (m.abs.)

(e) *sagàk*
from (a) cow cf. *sagà* (f.abs.)

(f) *daròl*
in grain cf. *darò* (f.abs.)

The only type of noun that appears to take the default clause for H association is that exemplified in (e) and (f). In PPs whose complements are masculine nouns, H never associates with the vowel of the final syllable, i.e., in such structures C-final nouns appear not to achieve H association via the default clause of 5. The earlier analysis, which grouped C-final nouns having H on the penult in the absolutive, together with V-final nouns having H on the penult in the absolutive (i.e., the analysis of 13) seems to be justified by this behaviour. It will be recalled that in order to accomplish the correct association of H, accent was assigned to the root-final syllable of all such nouns in virtue of their gender property (cf. 8).

We have, however, to take into account a difference in the status of the vowel preceding the postposition in V-final and C-final nouns. For V-final nouns the vowel is always present and has to be regarded as part of the underived lexical entry. For C-final nouns, however, the vowel clearly alternates with zero. By far the simplest analysis is to regard these vowels as epenthetic. Qafar syllable structure does not permit more than a single branching in the rhyme, as a consequence of which word-final consonant clusters do not occur. When a postposition or any other type of phrase-final element undergoes cliticization on to a C-final word, epenthesis occurs to ensure proper syllabification. Whether the epenthtic vowel will be realised as *ı*, *u*, or *a* is determined by features inherent in the immediately preceding vowel.[8] Providing this epenthesis is not required to apply until after H association has taken place, forms such as *cànal* (18(a)) and *danànak* (18(b)) pose no problem for the analysis proposed here. Shorn of all formalism, a sample derivation would then proceed as in 19.

19.	underlying forms	*/danan/ + /k/*
	cliticization	*danank*
	H association (default case)	*dan*$\overset{\text{H}}{\overset{\vert}{a}}$*nk*
	epenthesis	*dan*$\overset{\text{H}}{\overset{\vert}{a}}$*nak*
	surface form	*danànak*

Support for this interpretation comes in the form of other structures involving clitics. For example, Qafar makes productive use of a nominalization process which takes as its base any type of NP modifier and attaches to it a dummy head element *m*. e.g.

20. (a) *annim tayse*
which-*m* she-is-better
which one/thing is better?

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[8] This process is identical to that illustrated in the citation forms of C-final nouns given in Note 5.

cf. (b) *anni saga tayse*
which cow she-is-better
which cow is better?

(c) *meqèm zıse*
it-is-good-*m* he-built
he built a good one

cf. (d) *meqè buxa zıse*
it-is-good house he-built
he built a good house

In the event that the modifier is a C-final word, cliticization of *m* triggers vowel epenthesis, and in this case also H tone associated with an ultimate syllable (by default association) never shifts to the epenthetic pre-clitic vowel. e.g.

21. (a) *yublèn num bayeh*
they-saw person he disappeared
the person whom they saw disappeared

but (b) *yubleènım bayteh*[9]
they-saw-*m* she disappeared
the one whom they saw disappeared

There are a number of similar cases in the language, and unless we analyse the epenthesis as a late process occurring after H association, each of them will require a special accent assignment rule comparable to 8, though the morphological details would vary from case to case.

A worthwhile bonus accompanies this analysis. Hayward and Corbett (1988) argue that in Qafar the unmarked or default gender is the feminine. It is, for example, feminine agreement that is required by 'syntactic nominalizations' such as those seen in 20(a) and 21(b). Moreover, the verb agreement required by the great majority of cases of NP conjunction is feminine (for details, see the above-mentioned article). Putting together some of the conclusions of that paper concerning gender and the present ones concerning tone and accent, we observe an interesting correlation, namely, that default H tone association (i.e., the association which does not need to appeal to accent) and the default gender coincide in all cases except that of lexical nouns ending in consonants. But in this latter case consonant-finality already indicates that they must take masculine agreement. The situation may be summarised in this way: if a lexical noun ends in a consonant and/or carries accent, it is masculine; otherwise, it is feminine.

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[9] The change of agreement in the verb form follows from the fact that nominalisations in *m* take the default, i.e., feminine gender in Qafar. The alternation of vowel length in the relative clause verb froms in 21(a) and (b) result from the closed syllable contraction process referred to in Note 5.

To the extent that they have been investigated, loan words provide interesting confirmation that this correlation is significant. Thus, we observe that loan words such as those in 22 are pronounced with H tone on the final syllable even when the (stress) accent of those words in the source language is not final. Moreover, the gender agreement required by these words is feminine, even when their gender in the language of origin is not feminine.

22.	*tawlà* (f.)	table	<Ital. 'tavola (f.) id.
	gommà (f.)	tyre	<Ital. 'gomma (f.) id.
	kadò (f.)	prize	<Fr. ca'deau (m.) id.
	rankò (f.)	class, rank	<Ital. 'rango (m.) id.
	kamadoorò (f.)	tomato	<Ital. poma'doro (m.) id.
	kɨtfò (f.)	minced meat	<Eth.S. 'kɨtfo (m.) id.
	seftà (f.)	outlaw	<Eth.S. 'šɨfta (m.) id.

Consideration of what is known about tone and accent in Saho suggests that Qafar has undergone a simplification in the rule governing the association of H. It has been shown here for Qafar that H always associates with the first word in the phrase, whether that word is accented or not; the presence or absence of an accent only determines with which syllable association occurs. Welmers (1952) gives a brief account of accent ('stress' in his terms) in Saho, where he shows cases of H assosciated not with the first, but with the second word of the phrase. In fact, his data provide minimal pairs such as the following (p.157).

23.	*yibáxa*	vs.	*yibaxa*
	my son		my daughter

Since many types of nominal modifier might be interposed between *yi* and its head, the former has clearly to be regarded as a distinct word, so that the above forms should be written as *yi báxa* and *yi baxa*, thus revealing the phrasal nature of the phenomenon.[10] But the point to be noted is that although it is the first word in the phrase, H is not always associated with *yi*. Interestingly, those cases where this does not happen are precisely those where, in the cognate Qafar forms, the second (head) word would be accented according to our analysis; cf. Qafar:

24. (a) $\overset{\overset{\text{H}}{|}}{\textit{yi}}\ \textit{b}\overset{*}{\textit{a}}\textit{xa}$
my son — cf. *báxa* (m.abs.) son

(b) $\overset{\overset{\text{H}}{|}}{\textit{yi}}\ \textit{baxa}$
my daughter — cf. *baxá* (f.abs.) daughter

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[10] In essence, Welmers's analysis shows some similarity to the one advanced here (and, for that matter, the one advanced in Parker and Hayward, 1985). For Welmers, only high pitch on a non-final syllable is regarded as stress, high pitch on final syllables is said not to be stress (1952: 147ff). By contrast, in Blieses's analysis, wherever the high pitch occurs, it is identified as stress. By separating out accent (a diacritic with no phonetic content of its own) from a single phrasal high tone, we recognize a phonological identity in the same phonetic signal but avoid (a) proliferating accents; and (b) resorting to extensive stress reduction rules.

Cases similar to these abound in my fieldnotes on the Irob variety of Saho. e.g.

25. (a) *ku kàre geye*
your dog I-found
I found your dog   cf. *kàre* (m.abs.)

vs. (b) *kù dummu geye*
I found your cat   cf. *dummù* (f.abs.)

(c) *kulus sàgog uble*
fat cows I-saw
I saw fat cows   cf. *sàgog* (m.abs.)

vs. (d) *kulùs saga uble*
I saw (a) fat cow   cf. *sagà* (f.abs.)

(e) *qayso/b/ biso*[11]
grass-of colour
(the) colour of grass   cf. *qaysò* (f.abs.) *biso* (m.abs.)

vs. (f) *qaysò/f/ fire*
seed of grass   cf. fire (f.abs.)

(g) *cargeṣ ikok*[12]
(a) crocodile's teeth   cf. *cargèṣ* (m.abs.), *ikok* (m.abs)

vs. (h) *cargèṣ lafa*
(a) crocodile's bone   cf. *lafà* (f.abs.)

It does not seem to be the case that H associates with an accented syllable in a word any further to the right than the second one in the phrase.[13] e.g.

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[11] The inter-word gemination evident in genitive marking in feminine nouns in Saho and Qafar appears to involve an assimilation process. An alternative account for the phenomenon is given in Hayward (forthcoming).

[12] *ṣ* represents IPA [t͡s']; it occurs in Irob Saho exclusively in Tigrinya loan words.

[13] I have to own, however, that my investigations have not been exhaustive enough as to eliminate the possibility of this.

26. (a) *yi dikih biso*
my house-of colour
the colour of my house   cf. *biso* (m.abs.)

(b) *táy aqanih siba*
this frog-of leg
this frog's leg   cf. *siba* (m.abs.)

(c) *úsuk ed mare qare nuble*
he in-it he-lives house we-saw
we saw the house in which he lives   cf. *qáre* (m.abs.)

In 26(b) it should be noted that the absolutive form of the word 'frog' is *aqan*, and would, therefore, be regarded as accented, i.e., as *ȧqan*. But in Irob Saho, as in Qafar, there is accentual suppression in the genitive.[14] The behaviour of phrasal H in Irob Saho (and possibly in other varieties of Saho too) calls for a slightly more complex rule than that stated in 5 for Qafar. Tentatively, I would propose the following.

27. *High Tone Association (NPs, PPs)*

H associates with the first (leftmost) accented syllable in the first two words of the phrase. If neither word contains an accent, H will associate with the final syllable of the first word.

It may be hypothesised that at some point in the development of Qafar, the rule was simplified so as to scan only the first word in the phrase.

The somewhat larger domain of phrasal association in Irob Saho furnishes the final piece of evidence I shall adduce for the reanalysis proposed in this paper, for, as far as accent itself is concerned, both language varieties considered here can be regarded as identical. The difference between the earlier (1985) analysis and the present one may be reduced to the single issue of whether or not C-final nouns in which H associates with the final syllable in the absolutive are accented. For example, in the lexicon, do we regard nouns like *càn* and *danàn* as *ca⃰n* and *dana⃰n* or as *can* and *danan*? Based solely upon Qafar, the arguments for treating such items as unaccented are indirect, for they depend upon according plausibility to some other area of analysis first; in particular, to the analysis of epenthesis. Irob Saho, however, offers us the opportunity of testing hypotheses about these words, for since Irob allows H to associate with the second words of phrases in the event that the second word is accented and the first is not, we can inspect appropriate contexts to see how tonal association takes place. As the following representative examples show, when preceded by an unaccented word, nouns of the type under investigation behave as unaccented, and when followed by accented nouns, they again behave as unaccented.

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[14] This is not the case for certain types of noun in the nominative in Irob. Thus, in subject function, accent is not suppressed in C-final nouns such as *ȧqan* 'frog'.

28. (a) *tòy lubak*
that lion cf. *lubàk* (m.abs.)

and (b) *lubak iiba*
(a) lion's leg cf. *iiba* (m.abs.)

(c) *numà/b/ bakal*
(a) woman's goat cf. *numà* (f.abs), *bakàl* (m.abs.)

and (d) *bakal biso*
(a) goat's colour cf. *biso* (m.abs.)

(e) *laqin can*
hot milk cf. *càn* (m.abs.)

and (f) *canti biso*
(the) colour of milk cf. *biso* (m.abs.)

and (g) *cant/à/yni (= canti ayni)*[15]
(a) milk gourd   cf. *ayni* (f.abs.)

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[15] Both in Irob Saho and Qafar, the genitive of C-final monosyllabic nouns such as *can* involves suffixation of *ti*. Crasis occurs at vocalic junctures between words, as in 28(g)

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GLIDES AND PHONOLOGICAL CHANGE IN MOMBASAN SWAHILI

John Kelly

When I was first introduced by Jack Carnochan to the study of Swahili, some twenty or so years ago, the outlines of phonetics and phonology published in the then standard reference grammars such as Ashton (1944) and Polomé (1967) were remarkably bland. In the matter of the post-consonantal glides, for instance, the information provided was usually that there are two of these, y and w. Something might be said in addition about distribution — and that would be the sum of the discussion. The rest, we had to assume, was self-evident and not particularly interesting.

But work I have carried out on the speech of native Mombasans of the Old Town suggests to me that the situation with regard to the post-consonantal glides is not as simple as this. Firstly, the details of the phonetics are relatively complex, and worth describing for their own sake. And in addition the facts of the phonetics, taken in conjunction with others of distribution and frequency, are suggestive of a development in Swahili phonological structure.

The material on which this paper is based is drawn in the main from notes made on the pronunciation of an adult male speaker who has been a long-term resident of the Mombasa Old Town; these are supplemented with notes on other adult speakers of similar pedigree.

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The notes were made partly in Mombasa and partly in Britain whilst my main informant was resident there. In what follows examples in Swahili orthography will be italicised and a sans serif face will be used as a phonological script. C, G and V are used for 'consonant', 'glide' and 'vowel'; and the configuration CG will be called, for the purposes of this discussion, a 'combination'. Such things as vy- in e.g. *vyote* 'all' (Cl. 8) or kw- in e.g. *kwangu* 'my' (Cl. 15) which arise from the conjunction of morphological elements vi- and ku- and following stem-initial vowels, are taken to be 'combinations', as well as CG combinations that relate to no such morphological constituency, since what is to be said affects both kinds of CG equally. The phenomena under scrutiny appear to be common to all word-classes and to operate at all structural places. Examples can, then, be drawn from right across the lexicon.

The first striking thing about CG in Swahili is that the distribution of the two G types, palatal (y) and labiovelar (w), is not symmetrical with regard to the preceding C. This lack of parity is noted by writers as early as Steere (1884); and it is solved, to an extent, by Harris (1947) in his discussion of some Comorean material. The situation is that the labiovelar G appears after p. b. m. t. d. s. n (alveolar), t (dental), k. g. ng'. but not after f or v. The palatal G is found after only p. f, and v. Immediately, two questions arise. Firstly, why isn't the distribution the same for the two cases, there being no universal debarring of such combinations as fw or ky? Secondly, given that the distribution *is* asymmetrical, why is it asymmetrical in just this way? The answer to the first question may, of course, entail the answer to the second.

Harris's partial answer has to do with some of the missing combinations. In a section of his discussion devoted to 'Breaking phonemes up into a sequence of other phonemes' he takes Comorean ch, the correspondent in Comorean of Mombasan dental t, as k+y, sh as s+y, ny as n+y and j as d+y. The benefits he claims for this analysis are

- it 'eliminates four phonemes, on grounds of distribution and phonetic symmetry'

- it 'will broaden [the] distribution [of y] which will now approximate that of w'
- instead of a direct k to ch morphophonemic change in such forms as *cheupe* 'white' (Cl. 7) it introduces a morphophonemic change ki to ky 'which may parallel other morphophonemic changes'. The 'other changes' Harris has in mind here are no doubt those such as muV- to mwV-.

The interpretation suggested by Harris for these four items in Comorean can be generalised over a larger area of the consonant inventory and a table of the following kind tentatively set up as one interpretation of the Mombasan Swahili consonant system:

p+y	f(y)	t+y	s/sh	k+y	sh/t (dental)
b+y	v(y)	d+y	z/d(dental)	g+y	z/d (dental)
m+y	ny (?)	n+y	ny		

This extension of the Harris analysis has the advantage of broadening the distribution of y to an optimal range, namely, after *all* consonants, and of eliminating yet more items, so e.g. s and z, from any list of basic phonological consonantal elements.

It has a number of other virtues

- it accords with such reconstructions as we have for a postulated common language (Guthrie 1970) in respect of both the elements included in that common language and the changes envisaged in the historical development of some of these elements in combination. Polomé has pointed out with reference to Harris's work that it too did this same thing, that it 'hinted rather nicely at the diachronic development of the phonemes', though Harris arrives at his re-phonemicisation in the course of a purely synchronic analysis.

- it accords with some of the morphophonological relationships to be observed in the present-day language. Cases in point are causative forms such as *takata* 'be clean'/*takasa* 'make clean' or verb-noun derivations such as *finyanga* 'pot'/*ufinyanzi* 'potting'.
- it produces an outcome in the majority of cases that is, in surface terms, simpler, that is, C elements instead of CG ones. As a consequence of this more of the language is brought closer, in its surface structure, to the canonical Swahili CV syllable shape.

The table, and the interpretations it contains, appears to have at least one other advantage. For, by taking **fy** as **p+y**, it suggests *prima facie* that there is no possibility in Swahili of **fw**, at least from a CG source, since **w** and **y** are in system as G after C. If, then, **p+y** is **fy** and **p+w** is **pw**, then **fw** is not going to arise unless through some other derivation. In like fashion we might predict the non-appearance of **sw**, something that is discussed in more detail below. But **tw** (dental **t**) does occur, which, since this **t** is given in our table as being from **k+y**, suggests either that **w** and **y** should not be thought of as being in system in quite this simple way, or that there is a separate derivation for **tw** with dental **t**.

The upshot of the above situation is an interpretation, possessed of both synchronic and historical plausibility, in which the **y** glide has in many cases lost autonomous status, its palatal component being redistributed over (or 'through': the metalanguage is not very happy) the associated C.

The main purpose of this paper is to draw attention to a parallel phenomenon in the case of the other glide. In the speech of my Mombasan informant the phonetics of this is complex. My transcriptions show three different tokens for this item. These are given ad hoc notations here in bold and are as follows:

- a voiced rounded labiovelar approximant (**W**)

- a voiced labiodental approximant (**V**)
- a voiced spread velar approximant (**U**)

Their distribution is such that **W** occurs only with preceding velar or palatoalveolar C, **V** with preceding alveolar or velar C, and **U** only with preceding bilabial C. Both s and dental t are rare in my material as C in Cw. In the case of dental t I have two words, mtwa 'louse' and kitwa 'head': the first takes **U**, the second **V**, so there is no generalisation to be made about dental t and the phonetics of the following glide. The combination sw is in a different case. This is rare by virtue of the fact that it is non-Swahili in origin. The dictionaries contain only four items, *nswi* 'fish', *swala* 'Grant's gazelle', *swila* 'spitting cobra' and the verb *swaga* 'to drive'. Of these *nswi* is obsolete, and *swila* doubles with the canonical Swahili form *fira*, which is disfavoured probably as a result of the entry into Swahili of a homonym of Arabic origin with a sexual meaning. The word *Swahili* itself is also, of course, of Arabic origin. The combination sw can then be left out of account as being a marginal pattern of external provenance.

The three phonetic items represented in an *ad hoc* fashion above as **W**, **V** and **U** have one thing in common when viewed as manifestations of the glide element w. In the case of **W** the phonetics of the glide component include both a velar and a labial element, but this type occurs only after phonetic items that are themselves velar or rounded. In the first category are k, g and ng', in the second is sh. So the addition made by the phonetics of the G element is of one feature only, labiality in the case of the velar set, velarity in the case of sh. The same holds for the other places of articulation: in each case just one feature is added. So, for alveolar items, the phonetics of the G element is a labial (in precise terms labiodental) articulation, for labial ones it is a velar articulation. The labiodental articulations that manifest w after alveolar items are not systematically velarised: and the velar approximants that manifest it after labials are not rounded. Insofar as there is variability in the patterns observed it pushes the tendency described above still further, as it takes the following forms

- V can alternate with W, apparently freely, after velars. This removes the rounding element from the labiality associated with w.
- U can alternate with zero. In my material there appear such lexical items as

bwana	mister
jibwa	large dog
kaumwa	kalumba root
kimwondo	shooting-star
zimwi	goblin
mwana	child

My impressionistic transcriptions for these show strong velarisation centred at the place of the bilabial consonant b or m, but no appreciable glide-like feature between this consonant and the following vowel. There is, though, a marked difference in vowel quality to be perceived in many of the vowels adjacent to these labial consonants. So, for example, the accented (first) vowel of *tope* 'mud' is different from the accented (second) vowel of *kibobwe* 'cummerbund' by virtue of being fronter. *Kibobwe* is one of the words for which I have a version without a glide: and the difference between the relevant part of that version of *kibobwe* and the relevant part of *tope* resides entirely in the secondary articulatory effects at the labial consonant place and in the associated vowel qualities.

The result of this state of affairs is to redistribute the phonetic constituency of the glide element, producing in the second case a situation where there is no autonomous phonetic element at all to be recognised after C. To put the thing into segmental terms, the glide has been 'reduced to zero', though it will be clear from the description above that this characterisation is less than accurate. Here, as often elsewhere, a strictly segmental approach to matters phonetic and phonological has the effect of obscuring what is important. An earlier reference to the features discussed here (Kelly 1989) deals with them as 'prosodic categories' F (= front) (the y glide) and B (= back) (the **w** glide). In such a treatment the velarisation effect noted throughout -VCGV in e.g. *kibobwe* is treated as a unitary thing with an autonomous status.

There is a certain amount of documentary evidence to suggest that the situation described goes back in time. Older dictionaries carry such entries as *bana* for *bwana* (Sacleux 1939) and *sala* for *swala* (Krapf 1882): Sacleux gives a wide range of other forms in which Cw items alternate with variants without the G element. Examples are *nsi* for *nswi*, *bakia* for *bwakia*, *bata* for *bwata*, *chago* for *chwago*, *gaguna* for *gwaguna*, *kaba* for *kwaba*, *kacha* for *kwacha* and many more. But the majority of these variant pairs in the dictionaries arise across different varieties of Swahili, one version in one variety, the other in another. The material under examination in this paper suggests that a drive towards the reorganisation of CGV to CV is going on within one single present-day variety.

If this is so it is perhaps to be seen as the end-point in a chain of development, a development which may perhaps have run its course a hundred years ago in some other varieties of the language. The chain of development would be from CV- to CG- to C. All the **w**-type G elements under consideration here are derived from postulated earlier vowels. So *kùàdé, *kúápà and *kùé are given by Guthrie (1970) as the antecedents of modern *kwale* 'partridge', *kwapa* 'armpit' and *(m)kwe* 'in-law'; and, in Meinhof (1932), k̠ui, mũa, pua, tu+ala and tua for lexical items that all have **w** in modern Mombasan Swahili: *nswi* 'fish', *nwa* 'drink', *pwa* 'shore', *twaa* 'take', *(m)tw(ana)* 'servant'.

Bakari (1985) has taken glide-formation in the living varieties of Swahili to be 'motivated by the structure of the language itself, the desire to simplify the structure. The optimum preferred syllable structure is CVCV...By eliminating a concatenation of vowels by gliding them, a less complex structure is arrived at'. Whether CGV is a 'less complex' structure than CVV is a matter for debate: but what is certainly true is that CGV is a step on the route from CVV to CV.

Bakari further draws attention in this connection to a tendency on the part of younger speakers to use such forms as **vangu** and **vetu** for the more usual **vyangu** and **vyetu**, a development in the case of the **y** glide that looks like the counterpart to some of what is described for **w** above.

Other phenomena can be mentioned that fit into this overall picture. One is the favouring in all varieties of Swahili of such forms as *mzee* 'old person' and *zaa* 'give birth' as against the older, and now obsolete, *mvyele*, *vyaa*. Interestingly, doublet forms survive in the cases of *ngozi* 'skin' as against *ngovi* 'foreskin' and *mwizi/mwivi* 'thief', where in each case both forms conform to the CV syllable type: but stems such as *-vyele* and *-vyaa* with CGV have not endured alongside their CV counterparts.

The curious array of phonetic events that relate to the phonological **w** glide element in Mombasan Swahili CG combinations can, then, best be interpreted as a stage in the history of a sound-change that has the effect of bringing into being structures of an optimally simple CV kind: this change in the nature of the **w**-glide, now in its early stages, parallels an earlier one affecting the **y** glide element which is in its final stage. It is interesting to speculate on what could be the outcome of this situation. We have noted above that the accented vowels of the two words *kibobwe* and *tope* are different. The emergence of these two qualities alongside the disappearance of the glide elements is highly reminiscent of such well-known developments as the umlaut of Germanic languages: we might predict an overall chain of development of the kind

(C)VCGV > (C)**V**CV and (C)VCV > (C)VCV

where **V** is a different vowel from V. And it might not be too fanciful to label this Mombasan Swahili development 'w-umlaut', were it not that such labels are usually less than helpful. What is worth noting here is that the details of the material and the interpretation of it that is proposed throw light on the developmental mechanism of this kind of change. The question of whether the 'umlaut' phenomenon is to be construed as an 'effect at a distance' or as being mediated via the intervening consonant is answered here in favour of the latter hypothesis.

But the imagined, and natural, course of these things will perforce interact with social and cultural factors. The existence of an institutionalised writing system and of growing literacy, together with the pressures of standardisation as expressed through education and the media will all have their effects on the direction taken by language change. In the case under discussion the writing system formulated and promulgated during the twenties and thirties of this century reflects a variety of the language at a stage in which vy- forms have yielded to z- forms and in which w- forms have fully present glide elements. Such a writing system masks very effectively and in perpetuity processes of change and the patterns of symmetry or asymmetry they result in.

Given these considerations, there is no question of predicting an outcome for the phenomenon described here. But it would be at least illuminating to have more information, of a systematic kind, on the recent history and ecology of the **V/W** variation after velars, which, if the interpretation sketched in this paper is correct, and given ideal conditions, should tend in one direction rather than the other. Even without that, though, this material is valuable, for a number of reasons: firstly, for the view it gives into the life-history, as it were, of a sound-change; secondly as a good example of a sound-change that is neither instantaneous nor categorial and which has all the other characteristics of what Labov (1981) has called 'Neogrammarian sound-change'; and lastly as a demonstration of the way in which attention to phonetic detail and to the ranges of its variability regularly leads to fruitful insights into the workings of other levels of language structure.

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TONE SPACING

Ian Maddieson

1 Introduction

Phoneticians for some time have asked questions about the relationship between the number of elements in the sound system of a language and the way that these elements are arranged in 'phonetic space.' (This phonetic space is usually thought of as a multidimensional region defined by phonetic parameters related to physical properties of an articulatory or acoustic nature.) On the one hand, it has been said that phonetic elements are arranged so that they are maximally separated in the relevant phonetic space. Consequently, the larger the number of contrastive elements, the more closely crowded together they will be in the phonetic space; for example, a language with nine vowels will have them more closely crowded together than a language with only five (Liljencrants and Lindblom 1972). On the other hand, it has been proposed that a system with a larger number of elements will use a larger phonetic space to contrast the elements (Jaeger and Van Valin 1982, Disner 1983); that is, more extreme values of the same parameters will be used when a larger number of elements are being contrasted than is the case when fewer are involved. A compromise view proposes that a principle of maximal separation may govern the use of certain more basic parameters

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but that as the number of elements becomes larger, additional parameters are recruited to distinguish the elements (Maddieson 1979, Lindblom and Maddieson 1988, Lindblom 1988). That is, the dimensions of the space itself are enlarged by the addition of these new parameters. The purpose of this paper is to address the question of which (if any) of these theories predicts the structure of tone systems containing level tones.

If we consider only the degree of pitch contrast used for distinguishing level tones in like contexts, the first hypothesis would predict level tones maximally separated in the relevant part of the speaker's pitch range (it is assumed that some part is 'reserved' for intonational and expressive variation of pitch). In this case, the two tones in a language with only two levels would be produced towards the extremes of the pitch range. In a language with three level tones, the mid tone would be produced in the centre of the overall pitch range. Additional tones would subdivide the pitch range further. If this relationship holds, the pitch range to be used is assumed to be known and it is the size of the interval between tones that is determined by the number of levels. According to the second hypothesis, we might expect that there is a more-or-less fixed interval, relative to a speaker's range, which serves as a satisfactory degree of contrast between levels. In a language with only two level tones, these tones would be separated by this interval. In a language with three tones, the highest and lowest would be separated by twice this interval, and so on. In other words, the range of pitch for paradigmatically contrasting tones would be determined by the number of level tones in the language. We should emphasise that the spacing being discussed here is within an abstract phonetic space that represents a normalisation away from the influences of individual speakers and contexts.

In previous discussion of tone spacing views which basically correspond to the above hypothesis have been put forward. We will label one of these the Pikean view. In his book *Tone Languages*, Pike (1948) expressed the opinion that "a language with two registers tends to have the contrastive levels further apart than are the contrastive levels of four-register systems." He illustrates his view of this tendency with the diagram in (1):

(1)

2 level	3 level	4 level
High	High	High
	Mid	Mid Norm
Low	Low	Low

The diagram indicates further that, in Pike's view, the High and the Low tones in languages with two, three or four tones can be on the same level, whereas additional tones will be "inserted" between these levels. In other words, the overall range used for tonal contrast is the same and the *interval* between the tones is determined by how many there are. Among earlier authorities, Westermann and Ward (1933) seem to agree with this observation, and a similar view seems to underlie the tone letter notation and numerical transcription for tones proposed by Chao (1930). In an influential early article on tone features, Wang (1967) also indicates that larger numbers of tone levels are more narrowly separated than smaller numbers of tones. As he put it "the greater the number of distinct tones in the paradigm, the narrower the phonetic range of each tone would be." (This proposal also seems to encompass the view that wider phonetic variability will accompany a smaller number of distinctions.)

In a survey of tone universals (Maddieson 1978) I took essentially the opposite viewpoint. In this view, there is a more-or-less fixed interval between paradigmatically neighbouring tones, and the *pitch range* used for contrast between the set of tones is determined by the number of levels (at least for the majority of languages). Possible tone systems would include those which are represented by the diagram in (2):

(2)

2 level	3 level	4 level	5 level
		H	H
H	H	HM	HM
L	M	M	M
	L	L	LM
			L

This situation was summarised as (3) in Maddieson (1978).

(3) A larger number of tone levels occupy a larger pitch range than a smaller number.

Besides these extremes, some authors have put forward intermediate proposals. Woo (1969) suggests that systems with two or three level tones will separate those tones by a fixed interval, but that systems with four or five level tones will divide the upper and/or lower portion of the speakers' pitch range into smaller intervals. Hombert (1978) makes a similar suggestion, although the model of tone system structure which he puts forward does not fully implement this proposal but instead incorporates a Pikean view of the situation.

The question at issue, then, is do the languages of the world lean toward the Pikean model represented by (1) above, or to the model represented in (2) and (3), or to a compromise between the two? Moreover, can this question be answered when these models represent claims about an abstract phonetic space which cannot be directly observed? Perhaps more than with many other phonetic parameters, there are difficulties in determining whether tone levels are maximally separated or not because of the inherently relative nature of pitch contrasts, and the large number of influences which affect realization of tones in particular contexts. Some idea of the spacing of tones can be gained from comparing the intervals between fundamental frequency measurements reported for tones in a variety of instrumental studies (as in Maddieson, 1978). However, this technique is unsatisfactory, since there is no control for individual characteristics of speakers, and the contexts of the tones measured differ from study to study. Differences of experimental technique and measurement procedures introduce other factors which can affect the reported values. Consequently an interval between tones of, say, 15Hz in one study may not be equivalent to an interval of 15Hz in another case. While multi-speaker studies with a standardized set of techniques would provide a way round this problem, there are other strategies that can be used. Two possibilities are to examine the treatment of tones in loanwords which have been taken from one language into another, and to examine the phonetic relationships between the tones in the two languages of people who are bilingual speakers of tone languages with differing numbers of levels.

2 Tone loans

When words from a language with fewer level tones are borrowed directly into a language with more tones, the loan correspondences between tones will show which intervals are treated as equivalent. As an illustration, consider a disyllabic word with a High-Low sequence in a language with only two level tones which is borrowed into a language with three level tones. In the three level system, the tones of this word might be treated as spanning the full range from High to Low, as in (4a), or as only spanning part of the range, either High to Mid (as in 4b) or Mid to Low (as in 4c).

(4)

	2 level language		3 level language
a)	HL	⟶	HL
b)	HL	⟶	HM
c)	HL	⟶	ML

If the result of such borrowing is reliably as in (4b) or (4c) then the interval between High and Low in the two level language is being treated as a smaller interval than the High to Low interval in the three level language. A theory which proposes a standard interval between neighbouring tone heights, as in (2), predicts this equivalence better than one which proposes maximal separation. On the other hand, if the result is as in (4a), then the evidence favours a Pikean view, as in (1), since it indicates that the two tones of the two level system are separated as widely as the most widely spaced tones in the three level system. By examining loanwords between a number of pairings of languages it should be possible to determine if there is a consistent tendency for one or the other of these views to be confirmed.

Note that since this technique involves examination of the phonological tones of the loanwords rather than any measurement of pitch, the normalisation of individual differences is implicit in the data. An agreed perception of the tones of the donor language has been reached in the process of assigning a phonological representation to the words which have been adopted in the receiving language. Nonetheless, the technique must be used with appropriate caution. In order to be reasonably sure that a general principle is being observed, rather than some quirk applying to a particular pairing of a donor and a recipient language, it is desirable to have the same language represented as the donor in more than one pairing, the same language represented as the recipient in more than one pairing, and some pairings that are quite independent of each other (i.e. contain no language in common with each other). There are important considerations of adequacy of data involved too. A sufficient number of words is needed to assure that the equation between tones can be reliably established. The phonological structures of the languages concerned must be well enough known that misleading equations are not deduced. It must be ascertainable that the words in question are in fact loanwords and not historically related cognates, and that the direction of borrowing is known. The circumstances of borrowing must be such that the form of loanwords is likely to be based on general familiarity with the spoken version of the donor language, rather than based on an indirect channel of transmission.

Relatively few cases appear to satisfy these requirements. I know of no appropriate data available from American tone languages, though it is surely possible that there are Apachean loanwords in Tanoan languages, or Yucatec loanwords in Otomanguean languages. Data from Asian tone languages requires different handling for the most part since in many cases the tonal inventories include contour tones and strong co-occurence restrictions between segments and tones. As a result, the data reported here is drawn from African languages, where pairs of languages belonging to different major language families are involved.[1]

We will first examine loanwords from Hausa, a language in the Chadic branch of the Afro-Asiatic family, spoken principally in northern areas of Nigeria and adjoining parts of Niger. It was the language of the most influential political units in these areas in the nineteenth century (Forde 1967). Subsequently it became an official language of the Northern Region of Nigeria during colonial times and the early years of Nigeria's independence, and it has retained that status in several of the states into which the former Northern Region is now divided. Hausa has for some time played an important role in trade, religion, education and administration in the general area (Adamu 1978), serving as a lingua franca for speakers of the very large number of other languages of the region (Kirk-Greene 1967). Consequently, many languages have loanwords from Hausa. We will describe the patterning in three of these — Gwari, Nupe and Kpan — which all belong to the Niger-Kordofanian language family (Greenberg 1963).

Hausa has two level tones, High (H) and Low (L) (Abraham 1959). The sequences of these tones that are permitted in words are relatively unrestricted but words with some patterns, such as LL, are rare and others may be typical only of certain grammatical categories, such as plural nouns. There are no significant co-occurrence restrictions between tones and segments of particular types. A third tone has often been recognised: this is a falling tone that usually appears with a short vowel (often the vowel concerned is followed by a consonant cluster or geminate consonant, in which case a short vowel is obligatory). On various grounds this falling tone is convincingly analysed as a sequence of the High and Low tones on a single syllable. For example, the falling tone behaves like a H + L sequence in relation to the processes of downdrift/downstep and high raising. Meyers (1976) has shown that downdrifting applies to a sequence of like tones (i.e. a string of all H or all L). She calls the rule Like-Tone Lowering. However, when H and L tones alternate in sequence a steeper lowering pattern occurs, which may be labelled downstep. The falling tone fits into the same downstep pattern as disyllabic alternating H + L sequences. High Tone Raising increases the pitch of the last of a series of two or more contiguous high tones before a following low tone. When a falling tone follows one or more H tones, the same raising of the beginning of the fall can be observed. This is illustrated schematically in (5).

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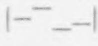
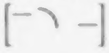
[1] The limitation to African data is perhaps appropriate in the context of this volume, since it was Jack Carnochan who introduced me to tonology of African languages, as well as to experimental phonetics.

(5)

H H L H	H HL H
sá:bón gàrí "new town"	fítôwá "coming out"
	

The phonetic output of high tone raising and like tone lowering will be shown to have some importance in the loaning of Hausa words.

Gwari. The first borrowing language examined is Gwari. Hausa loanwords in Gwari have been extracted from Hyman and Magaji (1970)[2]. In this and the other cases below, the tones of the Hausa words which have been borrowed are cited as given by Abraham (1962). The Gwari dialect represented is that of Kuta, a city-state which maintained effective political independence until the end of the nineteenth century, despite owing allegiance to the Hausa Sarkin Zazzau at Zaria and later at Abuja. Close contact with Hausa would undoubtedly have existed in more northerly Gwari-speaking areas earlier than in Kuta (Temple 1919, Hiskett 1984) and it is possible that some Hausa words would have entered Kuta speech from these dialects rather than directly from Hausa. There is no reason to expect tonal patterns to be modified in borrowing between the dialects.

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[2] A detailed list of the relevant words for this pair of languages is given in an appendix to an earlier informal version of this paper (Maddieson 1977). Similar lists are given for the other pairs of languages, but note that the wordlist for the Tswana/!Xũ pair does not reflect extensions and corrections kindly provided by Jan Snyman and Daan Lombard, Department of African Languages, University of South Africa.

There are three basic level tones in Gwari, High (H), Mid (M) and Low (L). All possible sequences of tones are found, although the vocalic prefixes of nouns may only bear L or M. As most Hausa words are consonant initial, this restriction has very little impact on the pattern of borrowing. A lowered variant of mid tone occurs following a low tone, and as the realisation of mid tone in a word-initial syllable followed by H. There are some exceptional cases in which a lowered mid tone is heard on the second syllable of a word even when no low tone precedes, or where a level high tone is heard even when a low tone does precede, but these exceptional tone patterns generally do not occur on loanwords from Hausa and can be ignored for our purposes.

The pattern of borrowing of Hausa words into Gwari is summarised in table 1. In the table, as in the other ones which follow, the tone patterns of the donor language are listed in the first column. These are grouped into level, descending, rising, and (if relevant) compound groups. Parentheses are used to abbreviate related tone patterns with differing numbers of syllables. The tone patterns in the borrowed forms are listed in the second column. The third column contains the number of borrowings with the given tone pattern in the recipient language. If all loans from a particular pattern have the same tone pattern in the recipient language, there will only be one row per pattern. In other cases, two or more variant patterns may be shown, or a most typical pattern is shown with the remain-

Table 1: Hausa loans in Gwari: Correspondences between tone patterns.

	Hausa	Gwari	number
level patterns	H H (H (H))	M M (M (M))	11
	LL	L L (L)	2
descending patterns	H L	H M	8
		M L	3
		others	4
	H H L	M H M	5
		others	1
rising patterns	L H	L M	11
		others	5
	L L H	L L M	6
	L H H	L M M	6
		others	2

ing words listed as others. In such a case, the 'other' patterns are clearly minor or are such that it is hard to equate them with that of the donor language.

From table 1 it can be seen that, with few exceptions, the interval between H and L in Hausa is treated as equivalent to the interval between neighbouring tones in Gwari, either H and M or M and L. Hausa H L words usually become Gwari H M words; Hausa L H words become Gwari L M words. H in Hausa words with no low tones is borrowed as Gwari M. The only salient irregularity appears in the final two syllables of Hausa H H L words, which are borrowed as Gwari M H M, rather than the expected M M L. This irregularity can be explained as a result of the syntagmatic effects of the high-tone raising rule in Hausa described above. This rule raises the second H in the H H L sequence so that an interval is created between the first and second H. Gwari represents this as a step up from M to H, and then represents the following H L interval as a step down from H to M, just as in the disyllabic case.

Nupe. Nupe is a language fairly closely related to Gwari and spoken in an adjoining area to the west. Although trade with Hausaland dates from earlier times, extensive direct contact with the Hausa language probably did not occur before the reformist Islamic Sokoto Caliphate to the north had consolidated its influence over Nupeland in the mid nineteenth century (Nadel 1942, Mason 1970). Consequently, Hausa loanwords in Nupe and Gwari are independently borrowed well after the separation of the two languages.

The Nupe tone system has three level tones (Smith 1967, George 1970). Contour tones arising from contraction of level tones also occur in certain contexts. An important rule produces a rising variant of H after L when a voiced consonant intervenes. Tone combinations are unrestricted except that the noun prefix /e-/ may only have L or M. The Hausa loanwords in Nupe have been extracted from Hyman (1970). A summary of the tone correspondences is given in table 2.

It is obvious that the well-represented Hausa H L and L H patterns are normally borrowed into Nupe as H M and L M respectively, that is, as the smaller of the two possible intervals available in the phonology of the recipient language. Also Hausa H in words with only H tones corresponds to Nupe M. However, in words with a Hausa tone pattern that contains both an ascending and a descending interval, such as L H L or H L H, it is not uncommon for one of these intervals to be represented as a 'single step' between tones in Nupe and for the other to be represented by a 'double step'. Thus the usual borrowings of Hausa L H L and H L H are Nupe L H M and H L M respectively. In the latter case the Hausa downstep rule probably provides an explanation. This rule ensures that in H L H words a markedly smaller pitch interval separates the medial L from the final H than separates the initial H from L, i.e. in Hausa H L H is schematically |¯ _ —| (in fact, final H after L can be even lower than shown here, Meyers 1976, Lindau 1986). Nupe has no comparable

Table 2: Hausa loans in Nupe: Correspondences between tone patterns.

	Hausa	Nupe	number
level patterns	H H	M M (M)	5
descending patterns	H L	H M	7
	H H L	H H M	2
		others	1
rising patterns	L H	L M	5
		others	2
compound patterns	L H L	L H M	7
		others	6
	H L H	H L M	8
		others	1

downstep rule, so the H L M pattern probably represents an attempt to capture the difference between the Hausa H L and L H intervals *when they appear together in the same word*.

In the two words where the Nupe pattern corresponding to Hausa L H L is M H L a similar explanation could apply, since Hausa L H L = |—¯_|. But the more common pattern for Hausa L H L is Nupe L H M. This is puzzling in view of the clear preference for the ascending interval L H in Hausa to be represented as L M in Nupe. And the Nupe L H M pattern cannot be accounted for as capturing the output of tone rules in Hausa. Apart from this unexplained correspondence, the general tendency of the Nupe data, as for Gwari, is also to provide evidence against a maximal spacing hypothesis for tones.

Kpan. A third language into which Hausa borrowings have been taken is the Jukunoid language Kpan, spoken well to the east of the

Table 3: Hausa loans in Kpan: Correspondences between tone patterns.

	Hausa	Kpan	number
level patterns	H H	H H	2
		others	1
	H H H	M M M	2
	L L (L)	L L (L)	4
descending patterns	H L	H L	3
		M L	2
		others	4
rising patterns	L H	L M	3
		others	3
	L L H	L L H	2
		others	1
	L H H	L M M	2
compound patterns	L H L	L M L	2
		others	3

Hausa heartland. The Kpan were included in the Jukun empire of Kororofa, subsequently conquered from the east by the Chamba and partially under the control of the Fulani emirate of Adamawa until colonial times (Meek 1931a, b, Hiskett 1984). Hausa loans in this language are almost certainly of recent origin, having entered the language in the present century because of the status of Hausa as an officially recognised language. The Hausa loanwords in Kpan have been extracted from Shimizu (1972). Shimizu (1971) describes the tone system of Kpan as one with three level tones. The three tones may combine freely in all possible sequences, although the prefix vowels of nouns are generally L before L or M and M before H. A summary of the tonal correspondences of Hausa words in Kpan is given in table 3.

There is inconsistency in representing the Hausa interval between tones as the smaller or the larger of the two options available in Kpan. There is also inconsistency in the way that words with only High tones are borrowed: the two H H words are borrowed as H H but the two H H H words are borrowed as M M M. However, if the numbers of ascending and descending intervals in Hausa represented in Kpan as 'one step' and 'two step' intervals are separately totalled, a distinct preference for the one step interval is found. Of the cases where an ascending interval is included in the Hausa tone pattern (L H, L L H, L H L, etc), thirteen move up one step in Kpan (from M to H or from L to M) and only five move two steps up (from L to H). Of the descending patterns in Hausa, ten move one step down in Kpan while eight move two steps down. At least some of these two-step drops can be understood as resulting from the Hausa High Tone Raising rule, particularly in the case of Hausa H H L and H H H L patterns becoming Kpan M H L and M M H L respectively. The interval from the Hausa raised H to the following L is represented by a two step in Kpan, but between the initial M tone and the final L in Kpan there is only a single step. It seems appropriate to consider at least these two patterns are representing the Hausa H . . . L difference esentially as Mid to Low in Kpan. This produces the totals shown in (6).

(6)		interval one step	interval two steps
ascending		13	5
descending		12	6
	Total	25	11

These numbers make it clear that it is prevalent for the Hausa interval between tones to be treated as equivalent to the interval between H and M or between M and L in Kpan. A theory of maximal separation of tones is less successful in predicting this pattern than a theory that posits a standard separation between adjacent tones.

IXii. The loans from Hausa into Gwari, Nupe and Kpan fulfill the requirement that loans from the same source into a number of different languages should be examined. This is one way to provide a check against correspondences that result from, say, a fortuitous coincidence of subsidiary phonetic properties of tones in a given pairing of language. Another way of providing the same check is to find instances where a given language has borrowed from more than one language. Southern Africa provides an example of this type, involving borrowing from two different Bantu languages into the Zu|'hõasi dialect of !Xũ, a Khoisan language spoken in Namibia. The number of words is not large, but the case is particularly interesting because of the four-tone system of !Xũ. Snyman (1975) labels these four tones Extra High (EH), High, Mid and Low. There are minimal contrasts between all four and most sequences are found to occur. The M tone is the most frequent in the vocabulary that Snyman has examined, followed in descending order of frequency by H, L and EH.

The first source of borrowed words in !Xũ is the Sotho-Tswana group of dialects, which have two level tones like the majority of Bantu languages (Krüger and Snyman 1986). Contact has been principally with Tswana members of this group, speakers of !Xũ and Tswana having been involved in recent times in a kind of master-serf relationship (Silberbauer and Kuper 1966). In addition, workers from both languages have often been employed together on farms in Namibia. The loanwords have been extracted from Snyman's !Xũ-Afrikaans dictionary, which identifies the Tswana source items but does not mark their tones. Tone-patterns for Tswana words have therefore been sought in appropriate places (e.g. Cole and Mokaila 1962, Cole 1969, Jones 1927, 1928, Tucker 1929) and checked against data kindly provided by Jan Snyman and Daan Lombard (p.c.). The resulting tone correspondences are summarized in table 4.

None of the !Xũ loanwords contains an EH tone, which might have been expected if maximal separation was the rule. Words with ascending (LH) tone pattern in Tswana are borrowed with a !Xũ tone sequence with an interval of one step, i.e. as either MH or LM. The loanwords which have descending intervals in Tswana seem once more to reflect the operation of tone rules in the donor language. An important rule in Tswana raises L to H after H in many environments

Table 4: Sotho-Tswana words in !Xũ: Correspondences between tone patterns.

	Sotho-Tswana	!Xũ	number
level patterns	L L (L)	M M (M)	5
		L L (L)	3
		others	1
descending patterns	H L	H H	3
		H M	2
		others	1
risng patterns	L H	L M	5
		M H	3

(Cole 1969, Krüger and Snyman 1986). The three Tswana HL words which come into !Xũ as HH are fairly straightforwardly derived from forms to which the rule HL → HH has applied.

The second donor language from which borrowings into !Xũ are noted by Snyman is Herero. Herero is from quite a different subgroup of Bantu than Sotho-Tswana, but it also has a tone system with two level tones (Köhler 1958, von Essen 1971). Unfortunately, although several Herero dictionaries are available (Kolbe 1883, Brincker 1886, Irle 1917, Meinhof 1937, Viljoen and Kamupingene 1983) none of them mark tone. The original tone patterns on the Herero words borrowed into !Xũ are unknown at present. However, it is still possible to observe that none of the loanwords has EH tone in !Xũ and in general there is no more than one step between the tones that they bear.[3]

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[3] These conclusions concerning !Xũ/Bantu comparisons are reinforced by an observation by Lanham and Hallowes (1956). On the basis of contrast they recognise three level tones in what they call Eastern Bushman, a language related to !Xũ that is spoken in South Africa. They then additionally argue that

The treatment of tone loans across the set of cases studied here is quite consistent with the view that tones are separated by a 'standard' interval adequate for them to be distinguished from each other, rather than being maximally separated. Conclusions based on loan comparisons can be complemented by data from the second technique suggested at the outset of this paper.

3 Bilingual speakers

A more strictly experimental strategy for studying the principles which govern tone spacing is to look at the relationship between the tones of bilingual speakers who speak two tone languages. Because the speakers are the same individuals, variation due to personal factors is eliminated. The present study concerns five male African students or teachers who are speakers of (at least) one language with two level tones and one language with three level tones, and had learned both languages in relatively early childhood.[4] Although one language was still considered the 'mother tongue' as the main language of the parental home, in several instances the subject was now more at ease in the other of his languages. All subjects also knew English.

Minimal or near-minimal sets of words containing the contrasting tones of the languages involved were selected. These were matched for segmental composition as far as possible across each pair of languages spoken by any subject. The words were embedded in similar

> "... another factor lending support to the recognition of three level tonemes is the unusually big fall from the tones marked as high tones ... to those marked as low tones. This fall is noticeably greater than that heard between the high and low tones in Nguni and Sotho (with their ditonemic structure) ..."

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[4] I am most grateful to the subjects who participated in this experiment for their time and patience. This project could not have been completed without the assistance in making contacts from Linda Hunter, Department of African Languages, University of Wisconsin.

positions in sentences of equal length and similar tone patterns in the two languages. A reading list of sentences for each language containing these 'target' sentences as well as others was then prepared and the subject was rehearsed in reading the relevant lists. Each subject then read each of the two relevant lists a number of times under good acoustic conditions while a tape recording was made.

Narrow band spectograms were made of (usually) six tokens of each utterance containing the items selected for tonal comparison. The fundamental frequency (F_0) at the mid point of the appropriate vowel was calculated from the frequency of the highest clearly visible harmonic. The results are summarized in Tables 5–7, which list the words used for each subject, number of tokens, the standard deviation and mean F_0 in Hz of the tones on these words. In the final column the differences between tones are given, rounded to the nearest whole number. The five comparisons in these tables show that in each case the difference between the tones in the two-level language is substantially smaller than that between the High and Low tones of the three-level language.

Two of the speakers, IS and IGM, were speakers of Nupe and Hausa, one of the language pairs in the previous section. Both speakers' 'mother tongue' is Nupe. Results from the bilingual study for these two subjects are given in Table 5. These confirm the phonetic basis for the patterns noted in loanword phonology. The High–Low difference in Nupe is about double that measured for the same speakers speaking Hausa. A similar degree of difference is seen between the two languages of speaker MEI speaking Edo and Yoruba, and of speaker IK speaking Hausa and Jaba. MEI is a 'mother tongue' speaker of Edo, IK is a 'mother tongue' speaker of Jaba. Results for these two subjects are given in table 6. For the four subjects in tables 5 and 6 it is reasonable to posit a more or less constant interval between a pair of most-similar tones, and to explain the language difference as resulting from the use of two such intervals in the three-level language. Note that the size of such an interval can be markedly speaker-dependent; subject IK has an unusually low voice with a narrow range but has a consistent interval between adjacent

Table 5: Hausa/Nupe bilingual speakers.

Subject	Language	Word	n	s.d.	Mean (in Hz)	Difference(s)	
IS	Hausa	gádó:	6	2.03	117	22	
		gá:dò:	5	4.92	95		
	Nupe	tsamā[a]	6	1.99	135	14	36
		edū	6	3.1	121	23	
		edū	6	6.62	99		
IGM	Hausa	gádó:	6	5.13	128	17	
		yárò:[b]	5	4.16	111		
	Nupe	edū	6	3.77	134	15	37
		edū	6	3.72	120	22	
		edū	6	2.92	97		

[a] This speaker did not pronounce the expected tone pattern for the word selected for minimal contrast. Instead a word with final high tone but a low vowel was selected. To the extent that low vowels tend to lower pitch, this substitution tends to work against the hypothesis of this paper.

[b] This speaker did not produce the high-low pattern on the original word selected here, so a word of similar structure was measured.

Table 6: Two additional comparisons of tones of bilingual speakers.

Subject	Language	Word	n	s.d.	Mean (Hz)	Differences	
MEI	Edo	áró	6	4.12	139	18	
		àrò	8	5.81	121		
	Yoruba	óró	6	3.86	145	22	42
		ōrō	6	2.6	123	20	
		òrò	6	9.81	103		
IGM	Hausa	háuʃí	6	1.76	87	8	
		háuʃì	7	4.16	79		
	Jaba	dzíī[a]	6	3.04	103	9	19
		dzìdzi	6	1.53	94	9	
		tsì[b]	6	2.65	85		

---

[a] This item has a high to mid tone glide in the final syllable. The peak of the high tone part was measured.

[b] A minimal contrast could not be found, so an item with a voiceless initial consonant was accepted. Since a voiceless initial might raise the measured low tone frequency, this choice works against the hypothesis of this paper.

tones of about half the size of the other subjects.

The remaining comparison, speaker JN producing Akan and Adangme, shows a narrower difference between the ranges used in the two languages. This set of data, shown in table 7, seems to differ from the other comparisons mainly because the interval between the two tones in Akan is larger than might have been expected. However, this pair of languages might not provide a clear case of comparison between two and three tone systems. It could be that Akan has effectively moved much of the way toward having the phonetic characteristics of a three-level language through the incorporation of lexical downsteps into a sufficiently large number of forms (Dolphyne 1988). Conversely, although Adangme has three contrastive tones in monosyllables and elsewhere, contrast between mid and low is neutralised in some environments (Kropp Dakubu 1974). These

Table 7: Akan/Adangme bilingual comparison.

Subject	Language	Word	n	s.d.	Mean(Hz)	Differences	
JN	Akan	dí	5	5.31	136	29	
		dì	8	5.81	107		
	Adangme	óró	6	3.59	134	23	39
		ōrō	6	2.6	110	16	
		òrò	5	1.27	95		

considerations may reduce the relevance of this comparison for the purposes of this paper.

4 Conclusions

The examination of the relative spacing of level tones using two strategies — examination of tone loans and bilingual speakers — indicates that tones are not separated according to a maximal spacing principle, at least not when comparison of two-level and three-level tone systems is at issue. These data are consistent with the view that they are instead separated by a relatively standard interval which does not depend on the number of tones being contrasted. This interval might perhaps be expressed as some proportion of the speaker's total pitch range. It is not certain that this finding can be generalised to systems with four or five level tones, since only one language concerned has a fourth level, namely !Xũ. Although no Extra High tones are found in the loanwords in !Xũ, this might be a reflection of the low lexical frequency of this tone. On this basis it is not certain that the compromise position described in the introduction, suggesting that spacing will be different in four and five level systems, can be ruled out.

To the extent that a general principle of phonetic spacing can be projected from these results, it is that normally a larger number of contrasting elements will occupy a larger phonetic space than a smaller number. However, different phonetic subsystems may differ in the way that this expansion is achieved. A phonetic space can be enlarged by use of more extreme values of given parameters, or by adding new dimensions of contrast. Tone systems seem to first exploit more extreme values of a pitch dimension. Other studies indicate that use of pitch is limited to a maximum of five contrastive levels. More elaborate tone systems add contrasts of pitch direction and slope (Maddieson 1978, 1979). On the other hand, consonant systems may typically expand the phonetic space by directly adding new parameters of contrast (Lindblom and Maddieson 1988), and vowel systems show tendencies both to add parameters and to reduce the spacing between their members as the number increases above about five. Only unusually small vowel systems, with less than five members, seem to use less than the full range of values of the most basic parameters of vowel quality (Disner 1983, Maddieson 1989). The pattern seen in tone systems may be primarily a result of the fact that they most typically contain a small number of members.

A further striking result of the analysis of the tone loans is that borrowing is often shaped by the surface phonology of the donor language. This is in contrast to the view put forward by Hyman (1970), who argued that borrowing is based on underlying forms. Apart from the effects of tone rules noted earlier, another prosodic effect seems to be reflected in Tswana borrowings into !Xũ. Tswana has a penultimate stress rule by which the vowel in the stressed syllable is lengthened and may have a rising pitch onset. The shape of one loanword in which the H syllable of a Tswana disyllabic HL word is reflected as a geminate vowel with a rising tone contour in !Xũ seems to be based on this phonetic pattern in the donor language. This word is given in (7).

7)

Tswana	!Xũ	gloss
thótà	tùuta	"hill"

The original final L also seems to show the effects of Low Raising in Tswana, as in !Xũ the final tone is of the same level as the end of the rising contour on the long vowel. When borrowing is based on direct familiarity with the donor language, and not mediated by the influence of orthograpy or pseudo-historical factors, surface forms might be expected to be the normal model for loanwords.

The importance of this fact was recognised by Newman (1984) in discussion of Gwandara. Gwandara is recognised as the closest relative to Hausa (Newman 1977), but has three rather than two tones. It shows a similar relationship between its tones and Hausa tones as is seen between Hausa and Nupe or Gwari tone. Newman comments that "The Gwandara tonal system seems to have resulted from the reinterpretation of Hausa surface tones in terms of the tone spacing grid of a language or languages having three tones." As Newman points out, ethnohistorical accounts describe the Gwandara as Hausa people who fled from Kano rather than accept Islam. These accounts seem to allow inadequate time depth for the degree of divergence between Kano Hausa and Gwandara to have developed by the normal processes of linguistic evolution. However, if such refugees formed the nucleus of communities whose other members were non-native speakers of Hausa, the divergence between Hausa and Gwandara can be accounted for by creolisation. Under these circumstances the processes seen in loan phonology might be expected to shape the outcome, such as the observed relationship between the tones.

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A PERFORMANCE OF A SWAHILI POEM ANALYSED

Joan Maw

In 1984 a conference was arranged by the Kenya Kiswahili Association on 'Swahili for the year 2000' (*Kiswahili kuelekea mwaka wa 2000*) in Nairobi. The conference was attended by many scholars both local and overseas, of whom I was one. The sessions were open and were attended by large numbers of the general public. Many of the speakers from the platform were scholars in linguistics and in education, members of ministries and institutions involved in language work. There were also many scholars of the traditional type present, linguists and poets and orators who knew and handled the language with skill and affection. In some cases these categories overlapped, but there were times in the debates when the traditional and the modern solutions proposed to problems were incompatible, and then the sparks flew! However, at the end of the conference there was a wonderful party for everyone, beginning with formal speeches (including one from the Vice-President of Kenya), and including all kinds of entertainment. One of the most striking and most warmly appreciated impromptu items was the recital of a poem of the celebrated 19th century poet Muyaka, by a scholar of the traditional school, Mzee Hassan Mwalimu Mbeya. The poem he chose was wonderfully apt for the occasion, dealing as it does with the question of what happens when opposites come together; and the audience certainly appreciated the irony of the choice, as well as the performance. The poem was of course recited, not read. A reporter from

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the *Deutsche Welle* was present, who recorded the whole thing, and he later kindly gave me a copy of his tape.

At the time, and for a long time after, listening to the tape, I simply enjoyed the performance, the memory of the occasion, the rapt audience, and their delighted responses. But then I began to ask myself questions and the main one was: how did he do it? Of course the poem itself was a fine work of art, which many of the audience may have known, but a poor performer would have had his audience fidgeting at least, if not melting away. The Swahili are connoisseurs of oral performances, and do not suffer incompetents gladly. Let me explain the problem. The poem is one of nineteen stanzas. Each stanza has four lines, and each line is divided into two hemistiches, each hemistich of eight syllables. Each hemistich rhymes, but the rhyme is reversed in the last line of the stanza. So the rhymes go *ab, ab, ab, bx*. The last line of each stanza names two opposites (e.g. word and deed) and then says 'if/when they come together'. So the final hemistich of each stanza is the same. Then the first line of the following stanza begins with the two opposites in reverse order, thus starting a new rhyme pattern, and goes on to suggest what may happen. For example, the last line of stanza x goes:

x.4 Oh the word and the deed, when they come together!
xi.1 Oh the deed and the word, promised and sworn;
The fulfillment may be delayed, at the donor's pleasure
Take care what you ask of your friend, however rich he is;
Oh the lion and the mare, when they come together!
xii.1 Oh the mare and the lion ...

In other words, there is a very formal structure in both rhyme and rhythm, and even in words, linking one stanza to the next. This gives great rigidity to the work. In his preamble, the performer explained that he was not going to sing, since he had no singing voice, but he would recite. What devices had he available in spoken Swahili for his performance, and how did he make use of them to keep the audience's attention?

Voice quality, tempo, intonation, pitch, and dynamics seem to me to be the main variables, and in this article I shall deal mainly with the last three. This is because I do not feel capable of saying anything systematic about the first two, I can only point out my impressionistic view of some high spots. For example, in stanza i line 2 hemistich a, on the words *na safari za mashua* 'on a journey by canoe', the stressed syllable on the word *safari* is greatly lengthened and breathy voice is used. This to me gives the feeling of a long and distant journey. Again, in iv.2.a *Humshukuru Rahabu* 'he thanks God', the stressed syllable in *humshukuru* is lengthened, which gives the impression of a heartfelt (and lengthy) thanks. Lengthening is also heard in vi.3.a *Akiwa mtu maliha* 'being a loveable person' on the word *maliha* 'loveable', suggesting extreme loveableness, so that one lingers over him. Again in vii.1.b we have lengthening in *nyoshi za tumwa habibu* '*clouds* of perfume for the prophet'; and in xii.4.a on the word *kioo* 'mirror', a long look, perhaps! There is also a very dramatic use of creaky voice in xv.3.b on the fearful words '"That's enough!"' heard on the Day of Judgement! There are a few deliberate breaks without interrupting the line of intonation. One in i.1.b after the word 'listen' and before 'I'll make a poem'; and one in ii.2 as discussed below. There is a single example of running-on between hemistiches in spite of separate tone-groups, in xiii.3, so that the possible separate meaning of 'a jewel, a sapphire' is rendered 'a sapphire jewel'. Otherwise tone-groups are separated by breaks. There is also one example of a cut-off end, dying away with final voiceless vowel, in xiii.4. This gives the audience a little shock. Finally, in the last line of the entire poem, the speaker accelerates, as if to go off at a run, giving the audience a parting shot 'What if time and change coincide, here and now?'. In general it seems as though certain aspects of voice quality and tempo are used for emphasising the meaning of particular lexical items. I don't think I can say more than this at the moment.

Extent of tone-group. With regard to intonation patterns, one can perhaps go further. I look first at distribution. The overwhelming norm is to have one tone-group to one hemistich. There are

75 lines in all (the speaker omits one line in stanza xvi) and thus 150 hemistiches. Of these, all but 10 have separate tone-groups. Tone-groups never extend over more than one line. The 10 that do coextend with a line are found as follows:

ii.2.a+b
x.2.a+b
x.4.a+b
xi.4.a+b
xii.4.a+b
xiii.4.a+b
xvii.3.a+b
xvii.4.a+b
xviii.4.a+b
xix.4.a+b

It will be noticed that the frequency of having a single tone-group over two hemistiches increases as the poem progresses, and it might be thought that the performer was speeding up a bit lest his audience get tired of repetition, especially as it will also be noted that the majority of cases involve the last line of each stanza, where the words 'when/if they come together' are repeated. However, the distribution of the important points in the tone-groups should also be looked at. In stanzas ii and x, where the single tone-groups are found in ll.2, and in xvii in 3, the salient syllable is found in the first hemistich and the tonic in the second. Thus each hemistich has an important resting-point, as it were. Also in ii.2 there is a lengthening on the salient syllable in *mtoto* 'young child' and a break before the second hemistich, so that the two halves of the line, though joined by one tone-group, are nevertheless kept somewhat separate. It may be that the performer feels that the meanings of the two hemistiches in all these non-final lines are too closely interwoven to be separated by a tone-group boundary. Their respective meanings are:

ii.2. 'though a young child he is very frightening'
x.2. 'the sick man recovers and leaves his bed'
xvii.3. 'it's a worldly rat that prospers these days'.

In the cases of the ll.4, in stanzas xi, xii and xiii, similarly, the tone-group is distributed throughout the line, with one important point in each half. But in the last lines of the last three stanzas of the poem, all the important points are in the first half-line. I feel that this is signalling that the poem is coming to an end, i.e. that the pick-up sign 'when/if they come together' is fading out. In fact it is interesting that the performance comes to a quiet but intense end — 'Oh, when time and change come together!'

Class of tone-groups. In the cases just discussed, all ten tone-groups are of type A (i.e. a 'fall'), as described in Maw and Kelly (1975). There the tone-groups isolated for Swahili, in order of frequency of occurrence, are as follows:

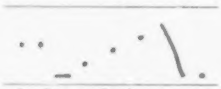
A	'fall'
B	'drop'
C	'high level'
D	'rise'
E	'rise–fall'
F	'fall–rise'.

Each tone-group has a tonic syllable, and the mnemonics refer generally to the movement of the tonic and the following syllable(s). The tone-group may also contain a 'salient' syllable preceding the tonic syllable. The positions of the tonic and salient syllables with respect to the syntax of the utterance may be 'neutral' or 'marked', independently of each other. For a more detailed description, see Maw and Kelly, op. cit.

Let us look first at the tone-groups in this recitation. Normally tone-group A is used at the end of an utterance. In Swahili traditional poetry, every line is end-stopped: there is never any enjambement. Perhaps it would be even more true to say that each line represents a complete idea, so that in some cases lines could even be transposed without much damage to the meaning of the whole. Between hemistiches there may be grammatical cohesion of a closer kind than between lines, but even hemistiches are often separate entities. One therefore might expect a high proportion of type A tone-groups, and that is overwhelmingly what we do get, far more, proportionately, than in the conversation passages analysed in *Intonation in Swahili*. Of the 140 tone-groups in this performance, no less than 110 are of type A. There are 18 instances of tone-group B (drop), and 2 of tone-group C (high). Slightly surprisingly, there are three examples of E (rise-fall), and none obviously of D or F. There are seven tone-groups that present problems of analysis, however, and these will be described later.

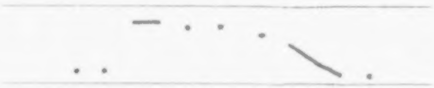
Distribution of tone-groups. Looking at the question of distribution, it might seem that with such a heavy preponderance of tone-groups of type A (fall), the effect would be bound to be monotonous. However, even with so few alternative patterns used, taking into account that in some cases there is a single tone-group over two hemistiches, it is found that all but two of the 19 stanzas have unique intonation configurations — even in the very few cases where two stanzas have the same intonation content, the distribution varies. Moreover, in the two cases where two (and as it happens, adjacent) stanzas have the same distribution of tone-groups, the actual manifestation of these groups is so different that they give a very different impression. (Stanzas vii, viii, and xii, xiii.) It seems an astonishing feat to achieve so much variety with so few resources! The pattern of distribution of tone-groups in the stanzas is given as Table 1.

Problem tone-groups. The seven tone-groups referred to earlier as presenting problems of analysis appear in Table 1 as X. X_1, X_3 and X_4 each occur only once; X_2 occurs four times, and always as the last tone-group in a stanza. (Stanzas ii, iv, vii and viii.) These latter deserve most attention because of their distribution and number. The phonetic outline of X_2 is to have the salient syllable *lower* than the previous ones, and the following syllables rising, with a fall on the tonic syllable. The examples show differing *widths* of pitch pattern, but the same configuration, as:

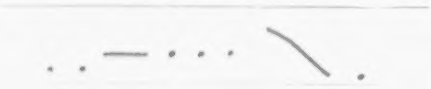


itakapo kukutana.

Now, either this is a new tone-group not previously noted, or else it is a third variation of tone-group A. Maw and Kelly (op. cit.) already noted two variants of A. The neutral variant has the salient as high or higher than the start of the tonic fall, as:



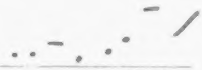
or else the salient is not very high but the tonic starts from a higher point, which we felt was a marked form, as:



giving emphasis to the word having the tonic. There are a number of examples of both types in this text. As for X_2, it seems from the distribution that it 'ought' to be an A-type tone-group, coming as it always does, at the end of a stanza. What of the meaning of this marked form? It seems to have a communicative meaning, such as "I've told you this already, surely you know it by now!" If X_2 has this special meaning, I think it should be classed as a marked form of A, but marked for social communication rather than for information emphasis. It would be interesting to follow up this point.

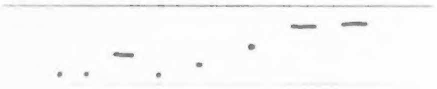
There is a parallel to such a social use of special intonation, in the use of the Rise–Fall, often used at the end of a question to signal an impatient or repeated demand for information. It is interesting that in this text there are no questions, but three examples of tone-group D (rise–fall). Two of them are in 1.a hemistiches, where the material is a repeat from the previous stanza, and the third is when the words echo each other (and are grammatically related): *zitatanapo tatizi* 'when they tangle in a tangle' (xiv.1.b). It seems this intonation (though quite different in phonetic ouline from X_2) is also being used to signal that we know something already — or else we must be very stupid!

The tone-group at iii.3.a (X_1) has an outline thus:

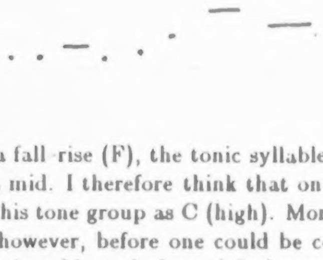


iii.3.a. aonapo yutimile

Here there are several problems. Firstly, is the raised tone on the first word a salient? Neutrally it would be, but it depends on the class of the tonic. If the tonic were a C (high), this salient position would be normal, but with a C tonic the following syllable would normally also be high:

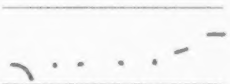


This salient would also be neutral if the tone-group were D (rise), but with a D tone-group the syllable after the tonic would be higher. If the tone-group were class B, the salient would be at the same level as the tonic. However, we may not have a salient here, because in any case a stressed syllable is normally higher than preceding unstressed syllables. But for a B tonic, the syllable following is below the tonic and level:



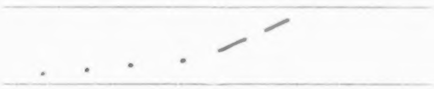
If the tonic were a fall-rise (F), the tonic syllable would fall, and to a low pitch, not a mid. I therefore think that on the whole I would prefer to classify this tone group as C (high). More work would need to be done here, however, before one could be certain, and also to suggest what meaning this variation might have.

The tone group at vi.1.a (X_3) has an outline thus:



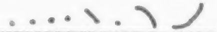
vi.1.a. Ai moyo na furaha 'Oh, desire and joy'

The word *ai* 'oh' normally gets a falling tone, which could be classified as a separate tone-group, of course, but which might also be considered as intrinsic to an exclamation of this sort (cf. the word *tu* 'only', which very frequently has high pitch), and thus perhaps is outside a consideration of intonation as a system. I shall say more about the treatment of *ai* later, however. In this tone-group there seems to be no separate salient syllable — thus all the emphasis is thrown on to the salient-cum-tonic, *furaha* 'joy' — and perhaps we should analyse the tone-group as rising, since the post-tonic is higher than the tonic syllable. But in other examples in previous work, the tonic and following syllables were themselves rising, as:



However, I am inclined to accept this for now as a form of tone-group D (rise).

The last singleton, the tone-group X_4 at xv.3.b has outline:

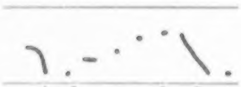


xv.3.b. atalia "Kata nawe" 'he'll cry, "Shut up, you!" '

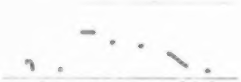
This is complicated by containing a piece of supposed speech, so the first word has no salient. The tonic, on *nawe* 'you (too)' we may take as F (fall-rise). The question is whether the fall on *kata* 'stop' should be taken as a salient or a separate tone-group. It has the outline of a tonic A, but it would be very unusual to have two tone groups on two words which belong so much together lexically. I think that, lacking further material, I would be inclined to take it as a salient at present. Very few examples of tone-group F have ever been looked at, as it seems fairly rare.

Placement of salient and tonic. Within the tone-groups, the placing of the salient and tonic in this poem is very often neutral. In a way this is not surprising, because within the structure of a hemistich, having eight syllables, given the polysyllabic nature of Swahili words, often there is not much choice! The possibility of absence of salient, however, is one that should be looked at — this throws all the attention on to the item at the tonic. That there are not many examples of this may be accounted for partly by the nature of good poetry in that every word counts! In fact, although there are a number of nominal groups constituting a hemistich which in normal conversational Swahili would only have a single stress point on the last item, in this poem only one such group has a single stress, xiv.3.a. One could say in this poem, then, that nouns and attributes are generally given equal importance. Such structures are found at i.2.b *safari za mashua* 'canoe journeys', x.2.b, xii.3.a, xiii.3.a, xiv.3.a and 3.b, xv.3.a, xvii.2.b — nine examples in all, and only the one, xiv.3.a, having a single stress. There is one further grammatical possibility, involving verbs in phase, of which only one example loses its salient, x.3.a *Akenda kajikutuwa* 'he walks strongly'. In fact, the repeated refrain of the poem 'when/if they come together', has this structure, and will be dealt with separately.

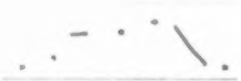
Another constraint on the free use of intonation is occasioned by the aforementioned repetition of the refrain ('when they come together') in the last hemistich of each stanza, and also by the repetition (though inverted) of every 4.a in the following 1.a (e.g. vii.4.a 'Oh silver and gold' — viii.1.a 'Oh gold and silver'). So it would seem reasonable to look at these hemistiches together. Firstly, every 4.a and 1.a starts with the word *ai* 'Oh'. As was remarked earlier, this word tends to have a falling pitch. (It does not, however, have a following break, which would tend to support the theory that it should not be considered as constituting a separate tone-group.) Of the 37 examples, 7 have a clear fall from a medium or high pitch to low; 15 have what I call 'subdued' fall, i.e. starting low and falling, i.e. start distinctly lower than the pitch of following stresed syllables; and in a further 15 cases the pitch is low and does not fall — in other words *ai* functions clearly as part of the pre-salient. Patterns look like:



iii.1.a ai afua na ndwele (oh health and sickness)



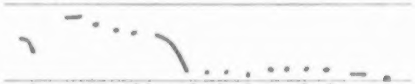
xviii.1.a ai tawangu na kiti (oh the chest and the chair)



xix.1.a ai simaku na chuma (oh the magnet and the iron)

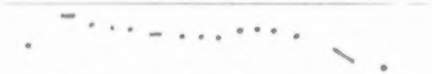
As might be expected, there is a tendency for the strong falls to occur in the earlier stanzas, the weaker ones towards the middle, and the lost ones towards the end of the poem, but this is not invariable. Distribution is shown in Table 2.

The next most frequent repetition is that of the words 'when they come together', which, as the final hemistich in each stanza, occur nineteen times. It has already been pointed out that sometimes this hemistich has a special intonation, meaning 'you know this already'. This applies to four examples, in stanzas iii, iv, vii and viii. At the other extreme, in seven cases (in stanzas x, xi, xii, xiii, xvii, xviii and xix) a single tone-group extends over the whole line, generally with the tonic syllable at the end of the first hemistich, and the second hemistich being a mere tail. Thus the words 'when they come together' are given minimal importance — presumably since we know they exist already. Thus:



x.4. ai neno na kitendo itakapo kukutana
(oh word and deed, when ...)

In three cases, however, the tonic comes at the end, e.g.:



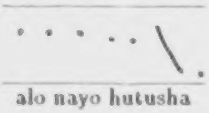
xi.4. Ai simba na farasi watakapo kukutana
(oh the lion and the mare ...)

This has the effect of making the two parts a whole ('Oh, when the lion and the mare meet' as opposed to x.4 'Oh word and deed, when *they* meet' and neutral with two tone-groups, e.g. xviii 'Oh the chest and the chair, when they come together'.) In the rest of the examples, where words have their own tone-group (eight cases) the placement of the salient and tonic is neutral and six of the tone-groups start from low pitch. The other two move mid to low. In other words, these are fairly inconspicuous. So we have four examples where words are made especially conspicuous, eight where they are fairly inconspicuous, and seven where they all but disappear. These variations are scattered throughout the text, but as one might expect, towards the end there is more disappearance, and the 'wake-up' examples tend to come in the middle.

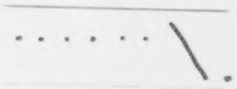
Within a tone-group there are, then, normally two information points, the words carrying the salient and the tonic syllable. In hemistiches 4.a and 1.a in this poem, there are always two important words (the two contrasted or compared ideas) as we have seen, occurring in the sequence 1,2 in line 4 and 2,1 in the following line 1 of the next stanza. These two important ideas would normally be expected to have the salient and tonic syllables on them. This is so in most cases (23 where the tone-group is co-extensive with the hemistich, plus 4 where the tone-group extends to cover the following hemistich, as dealt with in the previous paragraph). In the remaining seven cases where the tone-group is co-extensive with the hemistich, all the attention is drawn to the second item, by having what we have designated 'salient-cum-tonic' on the final item. Four of these are in first lines (v, vi, vii and xii) where they might be explained away in that in the previous line 4 both points have already been made. But although this is so for vi and vii, I think a more specific explanation can be made for v and xii. In the case of stanza v, the word having the special attention is *Janna* 'paradise', a word which is slightly unusual — at any rate the performer must have thought so because he interrupts the flow of the verse to interpolate "Janna ni pepo", 'Janna is paradise' and then begins the stanza again, with identical intonation. In the case of stanza xii, *ai farasi na simba* 'oh the horse and the lion' the intonation picks out 'lion', and indeed in the previous stanza, 'lion' was also picked out — or perhaps one should say that *farasi* 'horse' (sc. 'mare') is *not* picked out in either stanza. In stanza xi, the two last hemistiches are joined in a single tone-group, so that the important words are 'lion' and 'meet'. In my opinion this avoidance of notice on the word 'horse/mare', is a sign of delicacy on the part of the performer, for the idea of these living creatures coming together — and it is significant that the poet uses the personal plural marker in the verb — is fairly overtly sexual. Indeed, at the end of stanza xi the audience laugh, so *they* know what it is about. But the performer, as it were, keeps rather quiet about the female partner!

There are three cases of only one information point (salient-cum-tonic) in last lines, which is quite surprising because these are the first appearances of the new pairings. Indeed the first one is in the first stanza! But here is also the first appearance of *ai*, and it gets a high fall which gives it prominence. So the effect is something like '*Oh*! gift and *getter* ...'. The new ideas in stanzas iii and v are slipped in, low in intonation, so perhaps this is just for variation, as the new ideas in ii are very boldly given, and on the repetition of the new ideas in vi they have an unusual (rising) intonation.

Apart from the first and last lines, there are some other cases of marked tonicity, the majority having salient-cum-tonic on the neutral place (i.e. final lexical item). I think it may be significant that three of the eight examples are found in stanza xii, the most overtly sexual, and which has already been partly discussed, with reference to the down-playing of the 'horse' partner. In line 1.b we have *waingiapo kwenda mbio* 'when they start to *race*'; in 2.a we have (with very wide movement) *hutarakanya marimba* 'they feel about for *openings*/they play the *game*'; and in 2.b *na kutakuta nyayo* 'and keep touching *feet* (sc. hands)'. Plainly in this stanza the excitement of the subject is reflected in the large amount of marking in the intonation. In one of the remaining four cases, we should look at why there is not stress where theoretically there could be, and we see that, with a relative verb, there is not much new information, therefore the marking is freed for emphasising what comes later. In iii.1.b we have:

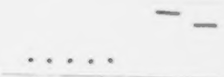


'he who has it (sc. good health already mentioned twice) leaps for joy'. By contrast, in xi.3.a we have:

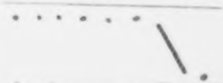


apao mwende akali

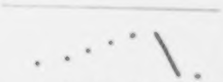
'he who gives his friend *a tiny bit*' spoken with the pitch moving from falsetto to low, and a very tense voice quality, gives stress to the idea of even the *least* gift (gets a reward from God). The remaining examples are similar, in that all the interest is on the word carrying the salient-cum-tonic, and in all cases there is an association with high pitch. (The matter of pitch in general will be dealt with in the next section.) So we have:



vi.2.a ikamwelea raha 'it brings him *joy*'

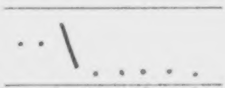


xi.2.a lendeapo siku mno 'though a *long* time goes by' (see also next para. but one)



xiii.2.a hujaalia jisito 'you are full of *blessing*'

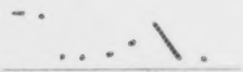
In one case the tonic comes early, pre-empting a salient, and putting all the emphasis on a non-final item;



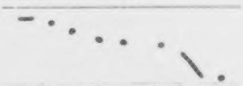
xiii.3.b yaakuti masherafu 'a noble *emerald*'

(For a nominal group of this structure, the last item (noble) would normally take the stress.)

In four cases the salient syllable itself is in a marked position. Two of these are on grammatical items, which is certainly unusual, viz.:

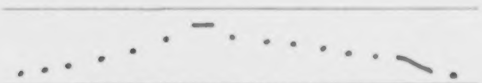


iii.2.b ili kutakawadhisha '*in order* to do what he wants'

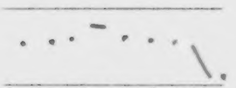


viii.3.b wala si kupa hukuno '*nor* is that proper giving'.

In two cases the salient comes late for special emphasis:

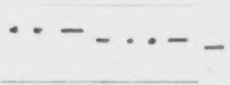


x.2.a+b alo na ndwele hupoa akapata na mwenendo
'the sick man *recovers* and starts to walk'



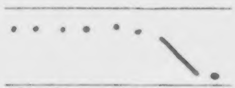
xiii.1.b tatia nuru takatifu 'cast a *clear* light'.

There are two examples of a phenomenon for which I have no explanation. This is when the syllables *before* the salient are high. I have not noted this in earlier work, and I suppose it to be another form of marking; but more information would be needed to be sure. The first example is with a tone-group B:



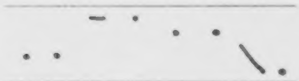
v.3.a apendalo akaona 'what he wants he sees'

In fact I think this is probably two consecutive tone-groups — although there is no suggestion of a pause between them — but still there is the question of the high unstressed syllables. The second example is with a tone-group A, and was mentioned earlier under salient-cum-tonic marking.



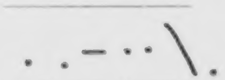
xi.2.a lendeapo siku mno.

Tonality. Apart from variations in tonicity, however, we also find variation in tonality. That is to say that while the salient and tonic syllables may or may not be neutrally placed, the actual outline of the tone-group may be marked. Tone-group **A** (fall), the most frequent choice, has two common forms, the neutral, where the salient syllable is the highest in the tone-group, and the tonic syllable falls from a lower (or equal) height, e.g.:



i.1.a simba ndume na wambuji 'Ladies and gentlemen'

and the marked form, where the salient is lower than the highest point from where the tonic falls, e.g.:



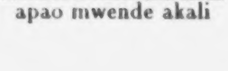
v.2.a na kuuza ihsani 'and pray for blessings'.

Of the ninety-seven examples, thirty-four are marked, which is perhaps a higher proportion than might have been expected. If we take the most marked case as salient-cum-tonic (or only tonic), i.e. that all the emphasis is on one information point; the next most marked case as having tonic from a higher point than salient (i.e. two information points but the second more important than the first) and the least marked as salient higher than tonic (i.e. two information points, neither special) then our proportions are 13:34:63.

Looking at examples of tone-group B, we find ten examples are neutral, and eight have salient-cum-tonic (i.e. are marked). As the essence of this tone-group is that the salient syllable (if present) is at the same height as the tonic, there is no room for tonality variation — unless example v.3.a turns out to be such.

The remaining twelve tone-groups are special cases of A and B, also C, D, E and F, all of which have already been mentioned. Their small numbers make it impossible to derive more about them here.

Pitch. Within a tone-group, then, there is variation of pitch forming a pattern. But also the whole tone-group has its own pitch position and shape which will modify its whole effect. For example, a falling tone-group may fall from a high point in the vocal range of the speaker, or from a low point, or from somewhere in between. Obviously this means a more or less wide movement throughout the pattern. Even in the case of tone-group B, whose essence is that it does *not* end on a low point, the whole tone-group may be high in the speaker's range, or medium, or low. Clearly from high to low is a continuum; nevertheless, listening to the material it seemed to me possible to characterise the highest and lowest points of tone-groups as high, medium or low, even though there were times when I hesitated. So I could say that a tone-group moved high–low (which would imply wide movement), high–mid, mid–low, or low(–low) — implying narrow movement. In one case, the voice moved so high as to be falsetto, falling to low:



ix.3.a apao mwende akali 'he who gives his friend a TINY BIT'

It seems reasonable to suppose that the choice of pitch placement and pitch range is meaningful. The most obvious interpretation is that a medium placement and range is neutral; a high, wide range gives extra prominence; and a low narrow range as it were, downgrades the prominence. For what it is worth, I give the crude figures, but I think it will be of more interest to see how these choices interact with the words, since here the performer seems so have more freedom of choice than, for example, in the choice of tone-group. So: only three groups are rising: two from low to mid, one from mid to high. Of the non-rising tone-groups, twenty-four are low; six are mid→mid (i.e do not fall to low); thirty-five are mid→low; twenty-two are high→mid; and fifty are high→low. So most of the tone-groups move from high to low or mid pitch (72), the next largest number move mid to mid or mid to low (41) and the lowest number (24) are low. Three rise. In other words, our performer varies his pitch considerably, but overall gives us a lively movement, and in any one stanza there is considerable variation. In fact, in a few cases I noted 'echo' when hemistiches came out *alike*, since it seemed more unusual to have the same movement than to have variation! That of course is another kind of variation!

Dynamics. The last variable I have looked at is dynamics. In one respect this seems to correlate with pitch movement, in that the loudest part of the tone-group coincides with the highest pitch, so that if the tone-group rises and then falls in pitch, it also has a crescendo followed by a diminuendo. By the same token, tone-groups that have been characterised as low in pitch are generally also quiet. But there is some variation. I have used musical notation for this part of the exercise, ranging from very loud, ff, through f, mf, mp, p, to very soft, pp. I would suggest that mf or mp are neutral, that f and ff are enhanced, and that p and pp are reduced. However, if I were to take voice quality into consideration, some of the p and pp passages would be pointed. I have noted 'conspiratorial' at one point, where the voice is quiet but the articulation tense. Taking into account the crescendo and decrescendo effects, I have characterised each tone group at its loudest point, so that 'f' means something like mf < f > mf. In fact, although I gave myself the possibility of an ff marking, I never found myself awarding it. In other words, this performer always had something in reserve! Twenty-two tone-groups were characterised as f, and all coincided with movement involving high pitch: nineteen were high to low; three high to mid; one mid to high. The greatest number, sixty-five, were mf: thirty-two coincided with high to low pitch movement; fifteen with high to mid; thirteen with mid to low; two with mid; and three with low pitch movement. The next most frequent were mp (thirty-six). Only four were associated with high pitch (two high to low, two high to mid); eighteen were associated with mid to low (or mid-mid, low-mid) pitch; and fourteen were associated with low pitch movement. The eleven p groups had no high pitch association, but seven mid-low and one mid-mid, and three low pitches. The pp groups, six of them, were two mid-low and four low pitches. There is thus a clear tendency towards correlation between pitch and loudness both within and as between tone-groups, but there is more freedom between the tone-groups than within. This shows more clearly as Table 3.

Conclusions. What does this all add up to? At the formal level, the work has thrown up a previously unrecorded intonation pattern temporarily assigned as a marked form of tone-group A. There are also examples of high unstressed pre-salient syllables, which need to be looked out for in future. Another thing to look out for in future is the question of whether the tone-group F (fall-rise) has a falling salient. Finally there is the question of the use of tone-group D (rise-fall) in statements. But the really interesting thing to see is how the performer uses all his devices, each of which is like a separate strand woven into making a whole. The tone-colour thus varies throughout the poem, so that the audience is held, and the performer points up the sections that interest him, despite the fact that some of his devices are more malleable than others — just as different instruments in an orchestra have their own possibilities and restrictions. Each hemistich, each line, each stanza, has a shape in itself and relative to the rest; and the whole poem has a structure including and transcending the parts. Table 4 shows all the forms of marking for each hemistich. On the scoring column I give + for marking choice of tonic, tonicity, tonality, high pitch, loudness and special points. I give – for low pitch and p/pp. Everything else is neutral, so a hemistich may score 0 (all neutral) or a number of pluses and minuses. This crude scoring I put into words in terms of the 'shape' of the whole stanza, and spell out the important parts of the message according to this scoring. Looking at these messages one sees that strands are intertwined in the stanzas, but also that meanings are intertwined throughout the poem, which moves between earthly and heavenly considerations, the idea that everything has a hidden meaning, the confusion of life, where the strong seem to win — but then what is strength? — and finally that times may change — or perhaps come to a stop! The whole poem is full of double meanings, reality vs. illusion, problems of this life and the next; and the complications of the ideas are matched by the complications of the performer's use of vocal devices. I have always liked this poem, but I have found my study of Mzee Hassan's performance of it has enhanced my appreciation of it, as it has also increased by respect for the insight and skill of the performer.

Text. This is the version of the poem by Muyaka as performed by Mzee Hassan. It differs slightly from the most recent published version of this poem, as edited by M. H. Abdulaziz (1979) q.v.

i Simba ndume na wambuji,   sikizani tatongoa,
Niketile vitongoji   na safari za mashua,
Leo nakumbuka mbiji   ya kutweka na kutua,
Ai pato na mpewa   litakapo kukutana.

ii Ai mpewa na pato   lipalo mtu kukua,
Angawa mwana mtoto   na kutishika kachewa,
Akawa na upasito   wa kutamani ukiwa,
Ai ndwele na afuwa   itakapo kukutana.

iii Ai afuwa na ndwele   alo nayo hutusha,

Akenda mwendo wa kule   ili kutakawadhisha,
Aonapo yutimile   akatamani kushasha,
Ai roho na maisha   itakapo kukutana.

iv Ai maisha na roho   yamtimupo kiumbe,
Humshukuru Rahabu   na upambo umpembe,
Kesho mbele ya Ilahu   Sirata isimkumbe,
Ai Janna na kiumbe   itakapo kukutana

v Ai kiumbe na Janna   mwanzo asitakiriyo,
Na kuuza ihsana   na tumwa aghufiriyo,
Apendalo akaona   na kila atamaniyo,
Ai furaha na moyo   itakapo kukutana.

vi Ai moyo na furaha   alo nayo hunawiri,
Ikamwelea raha   apendalo akaamiri,
Akawa mtu maliha   asizagawe ni shari,
Ai udi na ambari   itakapo kukutana.

vii Ai ambari na udi   nyoshi za tumwa habibu,
Atumio abadi   huandikiwa thawabu,
Tena hunali mradi   apendalo likasibu,
Ai fedha na dhahabu   itakapo kukutana.

viii Ai dhahabu na fedha   vitu vilivyo mfano,
Watu hutoa karidha,   hawapeani kwa tuno,
Watoao ni baadha   wala si kupa hukuno,
Ai samli na ngano   itakapo kukutana.

ix Ai ngano na samli   viliwa vyenye hiyari,
Vitu vitokavyo mbali,   Renu na Baunagari,
Apao mwende akali,   Mola humjaza heri,
Ai ziwa na sukari   zitakapo kukutana.

x Ai sukari na ziwa,   litialo mtu kondo,
alo na ndwele hupowa   akapata na mwenendo,
Akenda kujikutuwa   katambaza nguo pindo,
Ai neno na kitendo   litakapo kukutana.

xi Ai kitendo na neno   la ahadi na ziasi,
Lendeapo siku mno,   ni haiba ya mpasi,
Mwendo mtake kwa sono   awe na nafasi,

Ai simba na farasi   watakapo kukutana.

xii Ai farasi na simba   waingiapo kwenda mbio,
Hutarakanya marimba   na kutakuta nyayo,
Na kunguruma ja mwanba   ukimbile utishao
Ai mato na kioo   yatakapo kukutana.

xiii Ai kioo na mato   tatia nuru takatifu,
Hujaalia jisito   huonalo ukashufu,
Ni mshahaba wa kito   yaakuti masherafu,
Ai pua na harufu   itakapo kukutana.

xiv Ai harufu na pua   zitatanapo tatizi,
Kiumbe hughumiwa   lo lote asimaizi,
Zamani za kutongoa   wakati wa kubarizi,
Ai mkono na kazi   itakapo kukutana.

xv Ai kazi na mkono   mtenzi asikuliwe,
Ndipo awapo mnono   kujikaza unonowe,
Na siku ya makindano   atalia "Kata nawe",
Ai matunda na mwewe   yatakapo kukutana.

xvi Ai mwewe na matunda   ayaandikapo mato,
Juu la anga kutunda   kwa mkono wa kushoto,
Ai godoro na mto   litakapo kukutana.

xvii Ai mto na godoro   lipendezalo zitangu,
Lenyi huruma na duru   na haiba ya zikungu,
Alipatao ni faru   wa katika ulimwengu,
Ai kiti na tawangu   kitakapo kukutana.

xviii Ai tawangu na kiti   cha ng'amba chenye zikuku,
Kina tumba katikati   na pembe huku na huku,
Kinga kitakwi kwa uti   akipatao hushuku,
Ai chuma na simaku   kitakapo kukutana.

xix Ai simaku na chuma   zipambanapo fikira,
Mwungwana ni huduma   na shujaa huwa bora,
Bali hazipatani kalima   siku ya pia kurara,
Ai dira na duara   itakapo kukutana.

This is an English version of the poem, in which I attempt to convey the meaning, not a translation.

i My lords and ladies, hearken as I tell my tale,
I have wandered through the villages in my small canoe,
Today I think of sailing in my big yacht,
Oh, the gift and the client, when they come together!

ii Oh the client and the gift that raises one's status,
So that a mere youth becomes an object of awe;
The possessor of a fortune need never fear loneliness,
Oh illness and health, when they come together.

iii Oh health and illness, the healthy walk tall,
Going where they fancy, doing what they want
Feeling his strength, the healthy man disdains others,
Oh energy and life, when they come together!

iv Oh life and energy, when a man has them,
He thanks God for these crowning gifts,
And at the day of Judgement he will be spared the hard road,
Oh Paradise and man, when they come together!

v Oh man and Paradise, he who rests there,
Has prayed for blessings and followed the Prophet,
He sees his heart's desires entirely fulfilled,
Oh desire and fulfilment, when they come together!

vi Oh fulfilment and desire, he glows who has them,
He can take his ease and have all he wants,
He becomes attractive, untainted by ill-luck,
Oh incense and ambergris, when they come together!

vii Oh ambergris and incense, fit perfumes for the Prophet,
He who always uses them has his good deeds recorded,
And gets his desires, whatever they may be,
Oh silver and gold, when they come together!

viii Oh gold and silver, universal symbols,
People will do anything for them, they are not given even to a friend,
Very few part with them, and never as a free gift,
Oh butter and flour, when they come together!

ix Oh flour and butter, finest of foods,
Coming from abroad, from Goa and India,
Those who give away even a speck, God rewards generously,
Oh milk and sugar, when they come together!

x Oh sugar and milk, that make a man strong,
So that the invalid recovers and leaves his bed,
He walks strongly, his garments stream behind him,
Oh word and deed, when they come together!

xi Oh the deed and the word, promised and sworn,
The fulfillment may be delayed, at the donor's pleasure,
Take care what you ask from a friend, however rich he is,
Oh the lion and the mare, when they come together!

xii Oh the mare and the lion, when they run together,
Dancing around each other, playing touch and go,
Sighing like the wind, a frightful cacophony!
Oh the eye and the mirror, when they come together!

xiii Oh the mirror and the eye, light and clear,
If you are blessed, you will see in time,
Like a jewel, a noble sapphire,
Oh the nose and the smell, when they come together!

xiv Oh the smell and the nose, confusion worse confounded,
A man loses his senses, and understands nothing,
At festival time, in poetic contests,
Oh the hand and the handiwork, when they come together!

xv Oh the work and the hand, the master cannot fail,
He shines then, confident of his power,
When the contest comes, he'll say "Pipe down, you!"
Oh the chicks and the hawk, when they come together!

xvi Oh the hawk and the chicks, when he espies them,
He soars high above, though new-fledged himself,
And plucks them from the air left-handed, casually,
Oh, the mattress and the pillow, when they come together!

xvii Oh the pillow and the mattress, with beautiful buttons,
A lady with pearls in its embroidered borders,
It's won by a rat — O tempora, O mores!
Oh the chair and the chest, when they come together!

xviii Oh the chest and the chair, tortoiseshell with metal rings,
A central boss, and ivory at the side,
Like a rose in a thicket of thorns;
Oh the iron and the magnet, when they come together!

xix Oh the magnet and the iron, think how they clang together,
The great man must be deferred to, and the best man win,
There can be but one outcome, when it comes to the test,
Oh time and change, when they come together!

Table 1: Distribution of tone-groups.

i	A	A
	B	A
	A	A
	A	A
ii	A	A
	A	C
	A	A
	A	A
iii	A	A
	A	X_1
	A	A
	A	X_2
iv	A	A
	A	A
	B	A
	A	X_2
v	A	A
	A	A
	B	A
	B	A
vi	X_3	B
	B	A
	B	A
	A	A
vii	A	A
	A	A
	B	A
	A	X_2
viii	A	A
	A	A
	B	A
	A	X_2
ix	A	A
	A	A
	A	A
	A	A
x	A	A
	A	...
	A	A
	A	...
xi	E	B
	A	A
	A	A
	A	...
xii	A	A
	A	A
	A	A
	A	...
xiii	A	A
	A	A
	A	A
	A	...
xiv	A	E
	B	B
	B	A
	A	...
xv	A	A
	A	A
	B	X_4
	B	A
xvi	A	A
	omitted	
	A	A
	A	A
xvii	E	B
	B	B
	A	...
	A	...
xviii	A	A
	A	A
	B	A
	A	...
xix	A	A
	A	A
	A	C
	A	...

Table 2: Distribution of falls on *ai*.

Clear fall	Subdued fall	No fall
i.4		
ii.1		ii.4
iii.1		iii.4
iv.1		
iv.4		
v.1		v.4
	vi.1	vi.4
	vii.1	
	vii.4	
	viii.1	
	viii.4	
	ix.1	
	ix.4	
	x.1	
	x.4	
	xi.1	
	xi.4	
	xii.1	xii.4
	xiii.1	xiii.4
xiv.1		xiv.4
	xv.1	xv.4
		xvi.1
		xvi.4
		xvii.1
		xvii.4
	xviii.1	xviii.4
		xix.1
		xix.4

Table 3: Correlation loudness:pitch movement

	f	mf	mp	p	pp
high-low	20	31	2		
high-mid	3	15	2		
mid		2	3	1	2
mid-low		13	15	7	
low		3	14	3	4
	23	64	36	11	6

Table 4: Marking

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
i.1.a	A	neutral	neutral	mid-low	mp		0
i.1.b	A	neutral	neutral	mid-low	mp	echo a; break	+
i.2.a	B	*marked*	*marked*	mid-mid	mp		++
i.2.b	A	neutral	neutral	mid-low	*p*	breathy; salient length	− + +
i.3.a	A	neutral	neutral	*high*-low	*f*	word order marked	+ + +
i.3.b	A	neutral	neutral	*high*-low	mf		+
i.4.a	A	*marked*	*marked*	mid-mid	*p*		+ + −
i.4.b	A	neutral	neutral	*low*	*pp*		− −
Comment:	*Shape*: Build-up to 3.a, dip, then lesser peak on 4a. *Message*: The poet is going to tell us something important; recipient.						
ii.1.a	A	*marked*	*marked*	*high*-mid	mf		+ + +
ii.1.b	A	*marked*	neutral	*high*-low	mf		++
ii.2.a+b	A	neutral	neutral	*high*-low	mp	salient length	++
ii.3.a	*C*	neutral	neutral	mid-mid	mp		+
ii.3.b	A	neutral	neutral	mid-low	mp		0
ii.4.a	A	neutral	neutral	*low*	mp		−
ii.4.b	A	neutral	neutral	mid-low	mp		0
Comment:	*Shape*: Fall from high point in 1.a *Message*: There are recipients and gifts; gifts have effects.						

Table 4: (continued)

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
iii.1.a	A	neutral	*marked*	*high*-low	*f*		+ + +
iii.1.b	A	*marked*	neutral	*high*-low	*f*		+ + +
iii.2.a	A	*marked*	*marked*	*high*-mid	*f*		+ + ++
iii.2.b	A	*marked*	*marked*	*high*-mid	*f*		+ + ++
iii.3.a	X_1	neutral	?	mid-*high*	*f*		+ + +
iii.3.b	A	neutral	neutral	*low*	mf		+ −
iii.4.a	A	*marked*	neutral	*low*	mp		+ −
iii.4.b	A	neutral	*marked*	*low*	mp		+ −

Comment: *Shape*: Strong start, build up to 2a+b, then fall, slight recovery on 4.
Message: Great advantages of good health, move on.

iv.1.a	A	neutral	*marked*	*high*-low	mf		++
iv.1.b	A	neutral	*marked*	*high*-low	mf		++
iv.2.a	A	neutral	*marked*	*high*-low	*f*	salient length	+ + ++
iv.2.b	A	neutral	*marked*	*low*	mp		+ −
iv.3.a	B	neutral	neutral	*high*-mid	*f*	marked word order	+ + +
iv.3.b	A	neutral	neutral	*high*-low	*f*	marked word order	+ + +
iv.4.a	A	neutral	*marked*	*low*	mp		+ −
iv.4.b	A	neutal	*marked*	*low*	mp		+ −

Comment: *Shape*: Fairly strong start, rising to 2.b. Secondary peak held on 3.a+b.
Message: Praise God; delivery from judgement.

Table 4: (continued)

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
v.1.a	A	*marked*	neutral	*high*-low	mf		+ +
v.1.b	A	neutral	neutral	*high*-mid	mf		+
v.2.a	A	neutral	*marked*	*high*-low	mf		+ +
v.2.b	A	neutral	neutral	*high*-mid	mf		+
v.3.a	B	neutral	*marked*	mid-mid	mf		+
v.3.b	A	neutral	neutral	mid-low	mp		0
v.4.a	B	*marked*	neutral	*low*	*p*		+ − −
v.4.b	A	neutral	neutral	*low*	*pp*	very low	− − −

Comment: *Shape*: Medium strong start, generally declining to a very low point.
Message: In Paradise blessings; everything else is of minimal importance.

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
vi.1.a	*D*	*marked*	neutral	low-mid	mp		+ +
vi.1.b	B	*marked*	neutral	*high*-mid	mf		+ +
vi.2.a	B	*marked*	neutral	*high*-mid	mf		+ +
vi.2.b	A	neutral	neutral	*high*-low	mf		+
vi.3.a	B	*marked*	neutral	*high*-mid	mf	tonic length	+ + +
vi.3.b	A	neutral	neutral	mid-low	mp		0
vi.4.a	A	neutral	neutral	mid-low	*p*		−
vi.4.b	A	neutral	neutral	*low*	*pp*		− −

Comment: *Shape*: Fairly strong start, high point on 3.a, then decline to very low.
Message: The fulfilled person is attractive; what else matters?

Table 4: (continued)

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
vii.1.a	A	*marked*	neutral	*high*-mid	mf		++
vii.1.b	A	neutral	neutral	*high*-mid	mf	salient length	++
vii.2.a	A	neutral	*marked*	*high*-mid	mf		++
vii.2.b	A	neutral	neutral	mid-low	mf		0
vii.3.a	B	*marked*	neutral	*high*-mid	mf		++
vii.3.b	A	neutral	neutral	*high*-low	*f*		++
vii.4.a	A	neutral	neutral	mid-low	mf		0
vii.4.b	A	*marked*	neutral	mid-low	mp		+
Comment:	*Shape*: Fairly strong throughout until end. *Message*: Praising the prophet is important and will bring reward. Let us pass on.						

viii.1.a	A	neutral	*marked*	mid-low	mf		+
viii.1.b	A	neutral	neutral	*high*-low	mf		+
viii.2.a	A	neutral	*marked*	*high*-low	mf		++
viii.2.b	A	neutral	neutral	*high*-low	mf		+
viii.3.a	A	neutral	*marked*	mid-low	mp		+
viii.3.b	A	*marked*	neutral	mid-low	mp		+
viii.4.a	A	neutral	neutral	mid-low	*p*		−
viii.4.b	A	neutral	*marked*	mid-low	*p*		+−
Comment:	*Shape*: All fairly low-key, highest point 2a. *Message*: People will do anything for money. Let's get on.						

Table 4: (continued)

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
ix.1.a	A	neutral	neutral	mid-low	mf		0
ix.1.b	A	neutral	neutral	*high*-low	mf		+
ix.2.a	A	neutral	neutral	*high*-low	mf		+
ix.2.b	A	neutral	neutral	*high*-low	mf		+
ix.3.a	A	*marked*	*marked*	*high*-low	mf	falsetto	+ + + +
ix.3.b	A	neutral	neutral	mid-low	mf		0
ix.4.a	A	neutral	neutral	mid-low	mp		0
ix.4.b	A	neutral	neutral	*low*	mp		–

Comment: *Shape*: Low-key, sudden galvanising on 3a.
Message: How *mean* people are!

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
x.1.a	A	neutral	neutral	mid-mid	mf		0
x.1.b	A	neutral	*marked*	*high*-low	mf		+ +
x.2.a+b	A	*marked*	neutral	*high*-low	*f*		+ + +
x.3.a	A	neutral	*marked*	*low*	mp		+ –
x.3.b	A	neutral	neutral	*low*	mp		–
x.4.a+b	A	*marked*	neutral	*high*-low	*f*		+ + +

Comment: *Shape*: Two peaks, on lines 2 and 4, with deep dip between.
Message: The pleasure of returning health; the contrast word:deed.

Table 4: (continued)

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
xi.1.a	*E*	neutral	?	*high*-low	mf		+ +
xi.1.b	B	neutral	neutral	*high*-mid	mf		+
xi.2.a	A	*marked*	neutral	*high*-low	mf	high pre-tonics	+ + +
xi.2.b	A	neutral	neutral	*high*-mid	mf		+
xi.3.a	A	neutral	*marked*	*high*-low	mf	marked word order	+ + +
xi.3.b	A	neutral	neutral	*high*-low	mf		+
xi.4.a+b	A	marked	neutral	mid-low	mp	laughter	+

Comment: *Shape*: Strong start, two peaks, on ll. 2 and 3.
Message: You might wait a long time for a promise to be fulfilled; ask with discretion.

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
xii.1.a	A	*marked*	*marked*	*high*-low	mf		+ + +
xii.1.b	A	*marked*	neutral	*high*-low	mf		+ +
xii.2.a	A	*marked*	neutral	*high*-low	mf		+ +
xii.2.b	A	*marked*	neutral	*low*	mf		+ -
xii.3.a	A	neutral	*marked*	mid-low	mp		+
xii.3.b	A	neutral	neutral	mid-low	mf		0
xii.4.a+b	A	neutral	neutral	mid-low	mf	*kioo* long; laughs	+ +

Comment: *Shape*: Very strong start, decline followed by final blip.
Message: Sexual activity hidden = narcissism?

Table 4: (continued)

Hemistich	Tonegroup	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
xiii.1.a	A	neutral	*marked*	*high*-low	f		+ + +
xiii.1.b	A	*marked*	neutral	mid-low	mf		+
xiii.2.a	A	*marked*	neutral	*high*-low	mf		+ +
xiii.2.b	A	neutral	neutral	*low*	mp		–
xiii.3.a	A	neutral	*marked*	*high*-mid	mf		+ +
xiii.3.b	A	*marked*	neutral	*high*-low	mf	extra high	+ + +
xiii.4.a + b	A	neutral	neutral	*low*	mp	cut-off; laughs	– + +

Comment: *Shape*: High points 1a and 3b, sagging between.
Message: Reality vs. illusion; it would be worth a lot to be able to tell them apart.

xiv.1.a	A	neutral	neutral	*high*-low	*f*		+ +
xiv.1.b	*E*	neutral	?	*high*-low	*f*		+ + +
xiv.2.a	B	neutral	neutral	*high*-mid	*f*		+ +
xiv.2.b	B	neutral	neutral	*high*-mid	*f*		+ +
xiv.3.a	B	*marked*	neutral	*low*	mf		+ –
xiv.3.b	A	neutral	neutral	mid-low	mf		0
xiv.4.a	A	neutral	neutral	*low*	mp		–
xiv.4.b	A	neutral	neutral	*low*	*p*		– –

Comment: *Shape*: Quick rise to high point on 1b; all downwards thereafter, to very low.
Message: Things are very confusing.

Table 4: (continued)

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
xv.1.a	A	neutral	*marked*	*high*-low	mf		+ +
xv.1.b	A	neutral	neutral	*high*-low	*f*		+ +
xv.2.a	A	neutral	*marked*	*high*-low	mf		+ +
xv.2.b	A	neutral	neutral	*high*-low	*f*		+ +
xv.3.a	B	*marked*	neutral	mid-mid	mp		+
xv.3.b	*F*	*marked*	*marked*	low-mid	mp	creaky voice	+ + + +
xv.4.a	B	neutral	neutral	*high*-mid	mp		+
xv.4.b	A	neutral	neutral	mid-low	mp		0

Comment: *Shape*: Fairly strong start, sudden big peak on 3b.
Message: Not all will be saved!

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
xvi.1.a	A	neutral	*marked*	*high*-low	mf		+ +
xvi.1.b	A	neutral	*marked*	mid-low	mf		+
xvi.3.a	A	neutral	*marked*	mid-low	mf		+
xvi.3.b	A	neutral	neutral	*high*-low	mf		+
xvi.4.a	A	neutral	*marked*	*low*	*p*		+ − −
xvi.4.b	A	neutral	neutral	*low*	*pp*		− −

Comment: *Shape*: Positive start, dip, then high point on 3.
Message: The strong will prey on the weak, that's nature.

Table 4: (continued)

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
xvii.1.a	*E*	neutral	neutral	*high*-low	mf		++
xvii.1.b	B	neutral	neutral	mid-mid	mf		0
xvii.2.a	B	neutral	neutral	*high*-mid	mf	echo of 1b	++
xvii.2.b	B	neutral	neutral	*high*-mid	mf	echo of 2a	++
xvii.3.a+b	A	*marked*	neutral	*high*-low	*f*		+ + +
xvii.4.a+b	A	*marked*	neutral	*high*-low	*f*		+ + +
Comment:	*Shape*: Strong start, dip, then high on 3 and 4. *Message*: Sexual attraction is fine, but it's the rats that score; we should think about practical things.						
xviii.1.a	A	neutral	*marked*	mid-low	*pp*	conspiratorial tone	+ + −
xviii.1.b	A	neutral	*marked*	mid-low	*pp*		+ + −
xviii.2.a	A	neutral	neutral	mid-low	*p*		−
xviii.2.b	A	*marked*	neutral	mid-low	*p*		+−
xviii.3.a	B	neutral	neutral	*high*-mid	mp	extra stress	++
xviii.3.b	A	neutral	neutral	*high*-low	mp	intense tone	++
xviii.4.a+b	A	*marked*	neutral	mid-low	*p*		+−
Comment:	*Shape*: Positive start, high point on 3. *Message*: Everything has hidden meaning, you must struggle to get what you want.						

Hemistich	Tone-group	Tonicity	Tonality	Pitch	Dynamics	Other	Scoring
xix.1.a	A	neutral	*marked*	*high*-low	mf		+ +
xix.1.b	A	neutral	*marked*	*high*-low	*f*		+ + +
xix.2.a	A	neutral	*marked*	*high*-low	mf		+ +
xix.2.b	A	neutral	neutral	*high*-low	*f*		+ +
xix.3.a	A	neutral	neutral	*low*	mp		–
xix.3.b	*C*	neutral	neutral	*low*	mp		+ –
xix.4.a+b	A	*marked*	neutral	mid-low	mf	acceleration	+ +

Comment: *Shape*: Strong start, high point on 1b, then decline, but recovery to 4ab.
Message: Consider the strong (sexual?) attraction of opposites; the strong will win, but times may change!

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PITCH, LOUDNESS AND TURN REGULATION IN AKAN CONVERSATION

Samuel Gyasi Obeng

1 Introduction

In an earlier paper on Conversational Strategies (Obeng 1989), I noted in passing that pieces of stretches of talk making up the end of a current speaker's turn often co-occur with portions of either lento or rallentando tempo and a simultaneous rall-syllable-timed rhythm and a falling pitch movement. Specifically I suggested that falling pitch movement may also be turn-delimitative.

My main concern in this paper is to attempt to throw more light on a hitherto 'not-so-much-explored' area of conversational phonology: that of the relationship between turn regulation and the phonetic features of pitch and loudness.

To help validate and to make more explicit the relationship between turn regulation and each of the above-mentioned phonetic features, I have devoted some space to dealing with the correlation between each of the phonetic features and one interactive category termed in the literature interruptive (or overlapping) talk.

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2 Methodology

Methodologically, I adopt the inductive approach to linguistic analysis. I rely heavily on the strategies employed by Conversational Analysts, notably Sacks, Schegloff and Jefferson (1974).

Within the inductive approach to linguistic analysis statements made are not based on the analyst's intuition as a native speaker of the language under investigation but are rather arrived at inductively from empirical data — usually natural conversations — and are shown to be relevant for the interactants themselves. Detailed phonetic transcripts of relevant portions of my data are placed alongside my analytical claims to help explicate the logic of the interpretations of these claims.

Interactants' orientations to the turn-regulation signals are also brought to light.

Finally, statements and/or claims made are based on my entire corpus and not just upon the extracts which will be drawn from it.

3 Data

The data for this study consists of transcripts of two tape-recorded natural conversations of twenty-five minutes each. All the conversations were recorded without the knowledge of the conversational participants. Orthographic transcriptions were first made of the conversations. This was then followed by detailed impressionistic transcriptions of relevant portions. To help anonymize the interactants, only their initials have been placed next to their utterances. Utterances whose perceptibility is reduced by excessive noise or a marked falling off in loudness were not transcribed.

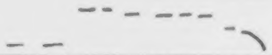
4 Discussion

The first observation I put forward relates to turn-delimitation and is stated as: the last few bits ending a current turn-occupant's turn co-occur with diminuendo or piano loudness and with simultaneous low-level pitch height or a falling pitch movement (FPM) in which the descent in pitch more or less reaches the bottom of the speaker's pitch range.

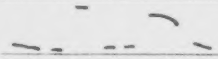
Extracts 1 to 3 below are just three instances of the many such cases that help illustrate this.

Extract 1

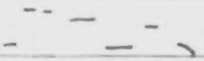
AY: Nà ɔ̀bòǹsám̀ yɛ́ dɛ́ń bɛ́há wó?
nɔ bʊnsam jɛ dɛ̃ɪbɛ ɦaʊ
< >——»



BO: Àà màhú nèà ɛ́há wò nò
a məɦu nɪɛ ɦaʊ nʊ



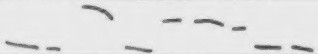
AY: ɛ̀déɛ́ bɛ́ń nà ɛ̀há mè
ɛdɪɛ bɛɪ nɛ ɦa mɪ
forte >——→



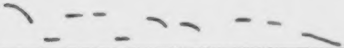
AY: How can the devil bewitch you?
BO: Ah! I now see your problem!
AY: What is it (my problem)?

EXTRACT 2

KA: màǹhù nó óò, ná yèse ɔ̀kɔ́ Òkyíńsó
mǝŋɦu noː nɪɛ sloko tʃinsʊ (0.6)
norm forte >——>



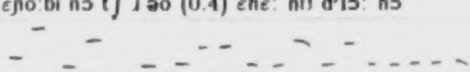
AB: Éèì! Nàná né nè Kóòkóò àsɛ́ḿ yí dèɛ̀
ei nana nɪ ni koːkʰwɐːs e miː dɪɛ
<> <———< >



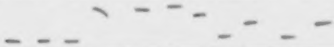
KA: I didn't see her. They said she had by then travelled to Okyinso.
AB: Ei! Nana and her Cocoa!

EXTRACT 3

AY: ɛ̀ǹyɛ́ òbí nà ɔ̀kyérɛ́ Ò ɛ̀hɛ́ɛ̀ ɛ̀nó dèɛ̀ ɛ̀wɔ̀ hɔ́
ɛɲoːbi nɔ tʃ ɹ əo (0.4) ɛɦɛː nʊ dʲɪɔː ɦɔ



BO: Nà fà nò *sɛ̂* wó né wó pàpá wɔ̀ hɔ̀
na fa nɪ sɛː wʊ nɪ ʊ papɐ wɔ ɦɔ



KY: No one teaches (anybody) yes, that's an established fact
BO: Assume that you are with your father . . .

In Extract 1 above, the loudness of the turn-occupant's voice increases considerably over the stretch "*-sam*" of "*obonsam*" (devil) but the loudness associated with the last syllables is pianissimo i.e. so low that perception becomes difficult. The pitch movement associated with the last syllable is falling and the descent in pitch reaches the bottom of the speaker's pitch range. The next speaker treats the relatively low pitch height and falling pitch movement together with the diminuendo loudness as turn-delimitative features and subsequently assumes the position of the turn-occupant as soon as the then current speaker terminates his turn.

In Extract 2 the last few bits of the turn occupant's (KA) stretch of utterance |tʃinsʊ| (Okyinso) is marked with diminuendo loudness, a relatively low pitch height and falling pitch movement. The next speaker (AB) orients to the turn termination done with the above phonetic features and takes up the turn occupancy.

As with Extracts 1 and 2, with Extract 3 a diminuendo loudness and a falling pitch movement are associated with the last three syllables of the turn occupant's stretch of talk |nʊ dˡɪɔː ɦɔ |. The next speaker is seen here assuming the position of a turn occupant after the previous turn occupant relinquishes his turn.

What seems rather interesting here is that in all cases such as those cited above and in other similar cases scrutinized in my data, the turn occupants themselves treat the diminuendo loudness, low pitch height and falling pitch movement as turn delimitative by actually giving up the floor whenever their turns are marked with any or both phonetic features (falling pitch and pianissimo or lento loudness) mentioned above.

Local, Kelly and Wells (1986) have also discussed in some detail the use of pitch and loudness in signalling turn delimitation. With pitch, they argue that in Urban Tyneside English there can either be:

(a) a pitch step-up at the end of a turn. Such a pitch step-up, they contend, is usually greater and achieves a higher point than any other pitch step-up in the turn;

or

(b) a drop in pitch on the last syllable of the turn to the bottom of the speaker's pitch range. This is similar to what obtains in my data.

On loudness, they argue that there is a swell — sudden increase and decrease during the ictus syllable of the last foot of the turn.

There is substantial evidence in my data to show that where piano, pianissimo or diminuendo loudness, a relatively low pitch height and a falling pitch movement are associated with a turn-occupant's stretch of utterance and he terminates his turn but the potential next speaker does not take over the turn-occupancy, the turn-occupant shapes his subsequent utterance in a way to portray to the next speaker(s) that he — the turn-occupant — wishes to terminate his turn and that he is only 'forced' to continue due to the potential turn-occupant's refusal to take over. Here it is common to hear the turn-occupant's utterance co-occurring with a relatively low pitch height and piano loudness as well as with markedly breathy voice.

In fact, a long pause which McLaughlin (1984) attributes to the next speaker often obtains between the turn-occupant's intended turn-terminating point and his subsequent onset. The extract below exemplifies the above point.

EXTRACT 4

DA: Enti *ɛsɛ sɛ* otua yɛn ka. Wo wo Effa, *ɛsɛ*
sɛ aban tua yɛn ka.

DA: So she (the government) has to pay (compensate) us.
I am talking to you Effah! She has to compensate us!

In the above, the voice quality associated with the piece stretching from "*ɛsɛ sɛ aban . . .*" to "*tua yɛn ka*" is breathy.[1] The stretch is also marked with diminuendo loudness and a relatively low pitch height. Moreover, the turn occupant — DA — is seen using direct instruction to invite the next speaker to take over the floor. This situation arose because although the turn occupant stopped speaking after the first piece — "*E̱nti ɛsɛ sɛ otua yɛn ka*" ('So she has to compensate us') — the next speaker failed to treat the phonetic features associated with the final bits of that piece of utterance as turn-delimitative.

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[1] See Obeng (1987) for greater detail.

The above discussions suggest:

1. that diminuendo loudness, a low pitch height and falling pitch movement are treated by turn-occupants and their co-participants as turn-delimitative;
2. that if by chance the next speaker does not orient to turn delimitation done with the above phonetic features, the turn-occupant calls the next speaker's attention to it.
3. that following from 1 and 2, loudness and pitch could be said to be valuable turn-regulation signals.

To give a further indication of my fundamental focus, I consider briefly the relationship between overlap and the phonetic features mentioned above. The two extracts below drawn from my data are the subject of the discussion which follows:

EXTRACT 5

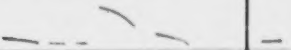
DA: …nè nwómá nà yɛ̀dé ákyékyérè sàá pòmá nó hó =
nɪ ŋwʊma nɪɛdɪ atʃtʃ ɹɪ sɛpʊma nʊ ɦʊ

KD: = Aàà
ȁ::

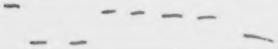
DA: Its hide/skin has been used to cover that staff.
KD: Oh I see

EXTRACT 6

KD Mmm asɛm-pa-yɛ-tia [na
m: asɛmpeːt^{sh}ia [na



DA: ɛna] atuduro nso kura no
ɛna] t^{s}udɹo su kuɹa nʊ



KD: (Oh, I see) with the *asɛm-pa-yɛ-tia* (a-genuine-story is argued in brief) staff …
DA: And he holds gun powder …

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A look at the extracts above and other cases of overlap found in my data suggests basically that in most cases of overlapping talk the interrupter's utterance begins at a place where the pitch movement associated with the turn-occupant's utterance is either low-level or falling and the loudness is either piano or diminuendo. This by implication suggests that interrupters treat low-level and falling pitch movements as well as diminuendo and or piano loudness as prospectively turn-delimitative.

In Extract 5, next speaker (KD) starts in a latch[2] position, thus orienting to the turn-occupant's turn-yielding done with a relatively low pitch height and a falling pitch movement with simultaneous diminuendo loudness.

In Extract 6, the next speaker treats diminuendo loudness and falling pitch movement as turn-delimitative and therefore interrupts the turn-occupant's last syllable. The turn-occupant also treats the above phonetic features as turn-delimitative by giving up the turn. Here it is seen that the degree of loudness and the nature of pitch of the interrupter's speech have a great influence on how long the turn-ocupant holds the floor/turn. In most cases the fading-out is swift when the interrupter's speech is louder and relatively higher in pitch than that of the turn-occupant. In Extract 6, for instance, the interrupter's "within overlap" speech is relatively louder and higher in pitch height than those of the turn-occupant and he — the next speaker — subsequently gains control of the turn. The turn-occupant, as can be seen here, fades out swiftly.

However, where the turn-ocupant intends to stay and fight for the control of the floor, he upgrades. His upgrading may (among other things) involve the use of crescendo loudness and raised pitch. The extract below helps illustrate this point.

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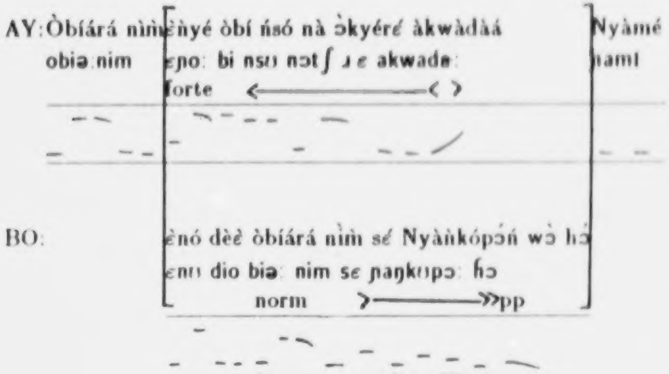
[2] KD's turn is juxtaposed to the just completed turn i.e. DA's turn.

EXTRACT 7


AY: Òbíárá nìm ènyé òbí ńsó nà òkyéré àkwàdàá Nyàmé
obiəːnim ɛɲoː bi nsʊ nɔtʃ ɹ ɛ akwadaː ɲamɪ
forte <——< >
BO: ènó dèè òbíárá nìm sé Nyàǹkópɔ́ń wɔ̀ hɔ́
ɛnʊ dio biəː nim sɛ ɲaŋkʊpɔː ɦɔ
norm >——>>pp

AY: Everyone knows (that). Even children know about God's existence.

BO: Everyone knows about God's existence.

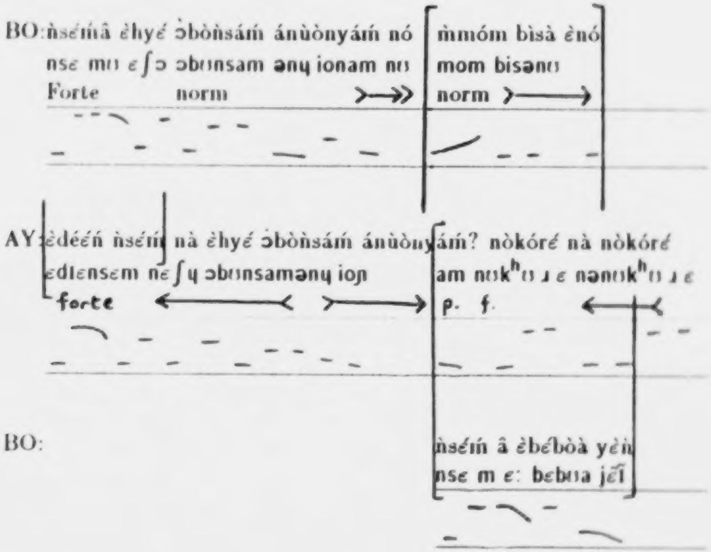
In the above example, AY, the turn-occupant, is seen upgrading by raising the pitch of his voice and increasing his loudness and subsequently gaining control of the turn. His post-overlap utterance is marked with diminuendo loudness and a relatively lower pitch height and he is seen terminating his turn — and thus treating diminuendo loudness and a low pitch height as being turn-delimitative.

This turn-occupant's upgrading and other cases of upgrading scrutinized in my data lead me to put forward a second observation stated below:

Forte or crescendo loudness with or without simultaneous raised pitch height or a rising pitch movement (RPM) is projective of further speakership by a turn-occupant. Specifically, I claim that (a) when a turn-occupant reaches a possible turn completion point — a place where he is most likely to be interrupted (or a turn-delimitative point) — he deploys raised pitch and crescendo loudness to hold on to his turn;[3] (b) the co-participant orients to the turn holding done with the above phonetic features; and (c) the turn-occupant, even when interrrupted, upgrades to win back his turn.

The extracts below help to bear out my claims.

EXTRACT 8


BO: ǹsέmâ èhyέ ɔ̀bònsám ánùònyám nó
nsε mʊ ε∫ɔ ɔbʊnsam ənɥ ionam nʊ
Forte
norm
ṁmóm bìsà ènó
mom bisənʊ
norm
AY: èdéέń ǹsέḿ nà èhyέ ɔ̀bònsám ánùòny ám? nòkórέ nà nòkórέ
εdIεnsεm nε∫ɥ ɔbʊnsamənɥ ioɲ
am nʊkʰʊ ɹ ε nənʊkʰʊ ɹ ε
forte
p. f.
BO:
ǹsέḿ â èbέbòà yèǹ
nsε m ε: bεbʊa jε̃ĩ

BO: Those stories which glorify the devil; ask those instead
AY: What stories glorify the devil? The truth, truth
BO: Stories which help us.

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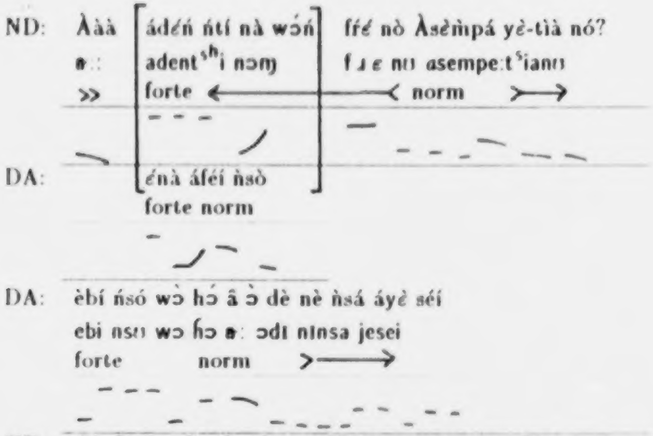
[3] This fact is also mentioned in Levinson (1984).

EXTRACT 9



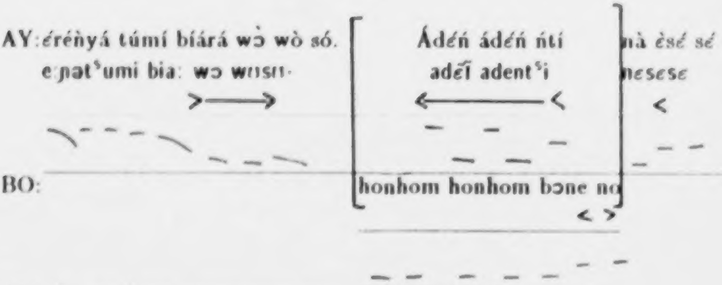
ND: Ààà [ádɛ́ń ńtí nà wɔ́ń] fŕɛ́ nò Àsɛ̀m̀pá yɛ̀-tìà nó?
ɐ:: adentˢʰi nɔŋ f ɹ ɛ nʊ asempe:tˢianʊ
>> forte ←——< norm >—→

DA: [énà áféi ǹsò]
forte norm

DA: èbí ńsó wɔ̀ hɔ́ â ɔ̀ dè nè ǹsá áyɛ̀ séí
ebi nsʊ wɔ ɦɔ ɐ: ɔdɪ nɪnsa jesei
forte norm >——→

ND: Oh I see why do they call it *Asɛmpa-yɛ-tıa*?
DA: And also
DA: There is one whereby he has made his hands like this.

EXTRACT 10



AY: éréǹyá túmí bíárá wɔ̀ wò só. [Ádɛ́ń ádɛ́ń ńtí] nà ɛ̀sɛ́ sɛ́
e:ɲatˢumi bia: wɔ wʊsʊ· adɛ̃ĩ adentˢi nɛsɛsɛ
>——→ ←——< <

BO: [honhom honhom bɔne no]
< >

AY: It can have power over you. Why should it . . .
BO: Spirit the bad spirit.

In extract 8 above, BO's turn is overlapped by AY's interruptive talk. Here, the interrupter's — AY's — interruptive talk begins during the production of the word "*mmom*" — a place which does not suggest itself syntactically as a possible turn-completion point.

What is interesting, though, is that the pitch associated with the last two pre-overlap-onset syllables is relatively low and the loudness is diminuendo. This suggests that the interrupter had been monitoring the turn-occupant's talk for the above-mentioned phonetic features. Specifically, it implies that conversational participants treat diminuendo loudness, low pitch height and falling pitch movement as turn-delimitative. The turn-occupant eventually yields the floor.

The interrupter's within-overlap utterance is heard as being of relatively high pitch height and as crescendo in loudness. This suggests that crescendo loudness and raised pitch are projective of more talk by the turn-holder. This fact is bolstered by the fact that in this same fragment (extract 8) when the new turn-occupant — AY — was interrupted and wanted to re-establish his position as the turn-occupant, he incorporated in his speech crescendo loudness and raised pitch, and by and large won the turn-occupancy.

In extract 9 the turn-snatcher — DA — interrupted the turn-holder at at a point where the pitch of KD's (the turn-holder's) voice had almost reached the bottom of his pitch range and the loudness level of his voice was low (pianissimo).

Sensing the danger of losing his turn, he upgrades. Here it is noted that although the turn-snatcher's loudness and pitch are high, those of the turn-holder are relatively higher.

Realising that the turn-holder has upgraded, the turn-snatcher recoils and thereby empowers the turn-holder to reestablish his position as the real occupant (holder) of the floor.

In extract 10 the interruptive talk begins at a place that suggests itself as a possible turn-ending point. This is because syntactically it is at the end of a sentence (a question) and phonologically the pitch of the turn-occupant's voice reaches the bottom of his pitch range. A diminuendo loudness is also associated with the stretch "*wo wo* *so*". The turn-occupant, however, felt that he had something more to say and did not therefore want to lose ownership of his turn. Here it is to be noted that he raises the pitch of his voice, increases the loudness considerably and subsequently reclaims the turn ownership. This supports the claim that crescendo loudness and raised pitch are projective of more talk and that conversational participants monitor each other's speech for the presence or absence of such features. The fact that the interrupter does not continue his utterance to a possible turn-completion point (because of the fact that the turn-occupant's utterance was marked with crescendo loudness and raised pitch) suggests that crescendo loudness and raised pitch are deployed to compete for a turn and are potential floor-winning features.

It is to be noted that where a turn-snatcher interrupts a turn-owner's turn with such features, he drops them as soon as he secures the turn. This observation is similar to that made by French and Local (1985:159) when they remark that conversationalists

> "gauge very precisely both when and how to begin their talk in relation to an ongoing turn."

The above discussion suggests that close and systematic attention to the relationship between overlap and the phonetic features of pitch movement and loudness throw further light on the functioning of turn regulation. It seems clear that crescendo loudness and raised pitch are projective of more talk by a current speaker whereas piano, pianissimo and diminuendo loudness deployed singly or conjointly with a low pitch height or a falling pitch movement are turn-delimitative.

The fact that my findings are more or less similar to those of French and Local (1985) goes a long way towards suggesting that the relationship between turn regulation and the phonetic cues in question is not ethnocentric in favour of Akan or English.

Most importantly, the findings suggest that, like syntax, gaze and gesture, phonetic cues of this sort have functional relevance in conversational management.

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PHARYNGEAL FRICATIVES, AND PIKE'S 'FRICATIVE' AND 'FRICTIONAL' CATEGORIES

R. K. Sprigg

Carnochan is best known for his contribution to the phonetics and phonology of African languages, Igbo, Hausa, Bachama, and others — he once reported his return to London from study leave in Nigeria to Firth by telephone with the words 'Mr. Chan of Kano speaking' — but it should not be forgotten that he also taught the phonetics of Arabic, and even devised and recorded a new course for that purpose. Since the time of Sweet 'the Arabic throat sounds' (Sweet 1895, 1904, 1906; Henderson 1971, 121–6), including pharyngeal fricatives, have attracted attention as a noteworthy feature of Arabic phonetics; so it is not unreasonable that I should offer my reflexions on the pair of pharyngeal fricatives, voiced and voiceless ([ʕ ħ]), as a tribute to my former colleague and friend of forty-seven years' standing.[1]

1 'Fricative' and 'frictional'; 'contoid' and 'vocoid'

At a very early stage in my study of phonetics I learnt, from the chart of The International Phonetic Alphabet, that the pharyngeal

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[1] I have treated [ħ] and [ʕ] as a voiceless and voiced pair of fricatives, as in the I.P.A. chart, but Catford 1977 suggests that in Arabic they may have also been differentiated by place of articulation at an earlier stage of the language (163–4).

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fricatives, [ħ ʕ], belonged to a set of 'fricative consonants' that included such other pairs of fricatives — oral fricatives — as uvular ([χ ʁ]), dental ([θ ∂]), labio-dental ([f v]), and bilabial ([Φ β]), and [ɦ] and [h] too, as 'glottal fricatives', though I no longer accept these two fricatives as phonetically comparable with the remaining pairs (Sprigg 1978, 6–7, 8, 9–10, 12–15, 16);[2] so it was disconcerting to find, later in my training in phonetics, that Pike 1943 did not admit pharyngeal fricatives into his 'fricative' category, in company with such oral fricatives as [χ ʁ Φ β]: an apprentice phonetician does not welcome disagreement among the authorities in the discipline.

Pike does, however, group the pharyngeal fricatives with all the same fricatives as are shown as such in the I.P.A. chart, apart from [h], in a category that he terms 'frictional', using as his criterion 'local friction at any point' for distinguishing 'frictionals', '(e.g. [s], [f], whispered vocoids, fricative [l], "voiced [h]")', from 'non-frictionals (or frictionless sounds, or sounds with cavity friction only)', '(e.g. [m], [o], [h], frictionless [l])' (140); by this criterion the pharyngeal fricatives [ħ] and [ʕ] are classed as 'frictionals' together with such oral fricatives as [χ ʁ θ ∂ f v Φ β], and together with the glottal fricative [ɦ] (but not with the 'cavity fricative' [h]).

'Fricative' versus 'resonant'. At a later stage in his analysis, however, in the course of distinguishing two further categories, 'fricatives' and 'resonants', Pike excludes pharyngeal fricatives from his category of 'fricative orals', '(e.g. [f], [s])', and assigns them to his category of 'resonant orals', '(e.g. whispered [a], timbres of "voiced [h]")', together with such 'non-frictional continuants' as [o] and [l]. In this way the pharyngeal fricatives of the I.P.A. chart, [ħ] and

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[2] The International Phonetic Alphabet (revised to 1979) shows only one relevant change from the 1947 scheme: [ɹ] has been removed from the 'Fricative' row, but continues to appear in the 'Frictionless Continuants and Semi-Vowels' row, newly named '(Median) Approximant', together with [ʋ ɻ j ɰ ɥ w]; for a phonetic description of the Lhasa dialect of Tibetan, however, a pair of post-alveolar fricatives [ɹ ɹ̥], is still needed.

[ʕ], and the laryngeal (and therefore glottal) fricatives [ɦ] and [ɦ̥] (corresponding to Pike's [ɦ] and [W], for 'whisper'; 142) are classed together as 'frictional' and 'resonant' but non-'fricative': 'frictionalized resonant orals include the following: whispered vocoids and whispered frictionless laterals; vocoids and frictionless laterals with voiced glottal local friction; vocoids and frictionless laterals with *voiced or voiceless pharyngeal local friction*. ... Frictionalised nasals include nasals with *any type of pharyngeal local friction*' (Pike 1943, 142)[3] [the emphasis is mine]. In phonetic symbolization, using [V] for any type of syllabic vowel, these 'frictionalized resonant orals' are [V̤̥ V̤̥̆ l̤̥ l̤̥̄ V̤ V̤̆ l̤ l̤̄ ħ ʕ ħ͡l̥ ʕ͡l ħ͡l̥̄ ʕ͡l̄]; and, using [N] for all types of nasal consonant, the 'frictionalised resonant nasals' are: [N̤̥ N̤ ħ͡N̥ ʕ͡N̥] (I have not, so far, been able to produce the last two).

Pharyngeal 'vocoids'. Before questioning Pike's having classified the pharyngeal fricatives, [ħ] and [ʕ], as non-'fricative' I ought first to mention that his having classified them as 'frictional' and 'resonant' leads to their also being classified as 'vocoid', as pharyngeal 'vocoids', rather than as 'contoid': 'The sounds which as a group function most frequently as syllabics are vocoids.[4] Phonetically they comprise the central resonant orals as already defined. Vocoids include practically all sounds which are usually called "vowels" (whether voiced, voiceless, or whispered), except that "fricative vowels" are excluded, while "vowel glides" such as [r], [w] and [y] are included' (143). Classifying [ħ] and [ʕ] as 'vocoids' conflicts with the I.P.A. classification, in which they are shown as 'consonants'.[5]

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[3] I have pressed [ɦ̥] into service to symbolise ***voiceless*** glottal (arytenoid) friction (Sprigg 1978, 12); for the distinction between strong whisper (arytenoid) and weak whisper (approximated) see Sprigg 1978 (10, 12), and cf. Sweet 1906, 10.

[4] I find this sentence ambiguous: at first sight it appeared to me to be a definition of 'vocoids' as 'the sounds which, as a group, function most frequently as syllabics', in which case it immediately conflicts with the classification of the sounds '[r], [w], and [y]' (I.P.A. [ɹ], [w], and [j]) as vocoids later in the same paragraph, since they ***never*** function as syllabics; the context, however, suggests that this sentence should be understood not as a definition but as an observation: it is the vocoids, not the contoids, that, as a group, function ***most frequently*** as syllabics. This statement does not prevent a sub-class of vocoid, containing [ɹ], [w] and [j], from being, by definition, non-syllabic. Nor does it prevent a small

2 The 'pharyngeal cavity' and the glottis

I have no difficulty in accepting Pike's classification of the *glottal* (and, therefore, laryngeal) fricatives '[ɦ]' and '[W]' (or [ɦ̥]) as 'frictional' and 'resonant', and, therefore, as 'vocoid';[6] but, in separating the *pharyngeal* fricatives [ħ] and [ʕ] from the other *lingual* fricatives [χ ʁ θ ∂], etc., he seems to me to have mis-classified them. [ħ] and [ʕ] owe their classification as 'resonant', not 'fricative' (142), to a combination of two factors: (2.1) Pike's having distinguished the pharynx, or throat, from the mouth, or 'oral cavity', with the status of a

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sub-category of contoid from being syllabic on occasions: 'resonant nasals and lateral resonant orals comprise a group of contoid sounds that are often syllabic, but by no means so often as vocoids' (143).

I used to classify [h] with [ɹ], [w], and [j] as invariably non-syllabic until I found an instance of it as syllabic in the pronunciation of the Japanese word *hite* as '[hi̥ te]' in Sawashima 1971 (11); Sawashima agreed with me that the wide aperture between the vocal cords in his accompanying fiber-optiscope frames for this syllabic vowel, '[i̥]', was appropriate to a (voiceless) breathed vowel, [hⁱ] (or [h̩]) not to a (voiceless) whispered vowel, [ɦ̥̩], hence I was obliged to revise my opinion about a possible syllabic function for [h/ h̩].

[5] Pike's vocoid category and the I.P.A. chart's vowel category are in close agreement except that Pike's sub-category of vocoids '[r], [w], and [y]' (143) are classed as consonants, '(Median) Approximant', [ɹ w j], in the I.P.A. chart 'revised to 1979'.

[6] For [ɦ̥] see note 3.

separate 'cavity', in a set of five 'cavities': oral, nasal, pharyngeal, pulmonic, and oesophageal; and (2.2) his having included the larynx (or, at least, the glottis and that part of the larynx which lies above the glottis) in the 'pharyngeal cavity': 'it does not seem expedient to attempt to work with a classification which would separate the laryngeal and pharyngeal cavities' (85–6). If the pharynx were to be treated as part of the 'oral cavity', or if the larynx were to be treated as part of the 'pulmonic cavity', or given the status of a separate, and sixth, cavity (or if the 'cavity' concept were to be given up), what I see as a mis-classification of the pharyngeal fricatives would not arise; so it is worth while seeing how strong the case is for the two factors that have determined Pike's classification.

2.1 Delimiting the 'pharyngeal cavity'.

The 'pharyngeal cavity' is not easy to delimit physiologically: Pike supports his diagram 'Fig. 1 Cavities' (85) with such specifications as glottal closure and oesophageal closure, 'contained within the pharyngeal cavity at its lower limit', a velar (or uvular) closure, lying outside the pharyngeal cavity, at the point where it meets the oral cavity, and a 'velic' closure, also lying outside the pharyngeal cavity, at the point where it meets the nasal cavity (1943, 85–6). When any of these four closures is in position, therefore, the appropriate limit of the pharyngeal cavity is, admittedly, clear. Thus, during glottal-stop and glottal-plosive articulations, and during ejective and injective articulations, [ʔ k' kˤ], the lower limit of the pharyngeal cavity is clearly defined[7]; otherwise, it merges with the sub-glottal part of the larynx in a single pharyngeo-pulmonic chamber.

Since the glottis, even when fully open, is a relatively narrow channel, the lower limit of the pharyngeal cavity is more easy to determine than its upper limits.

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[7] For the term 'injective' see Sprigg 1978, 8; but Catford's terms 'glottalic pressure and suction stops', e.g. [k' $\overset{<}{\mathrm{k}}$'] (Catford 1977, 71) are equally systematic, if not more so.

At its upper extremity the pharyngeal cavity can be clearly delimited, physiologically, from the oral cavity during velar articulations, whether plosive, nasal, or click, [k g ŋ ʘ ʇ ʖ ʗ], by a dorso-velar barrier; but, in the absence of this barrier, the pharyngeal cavity merges imperceptibly with the oral cavity in a unitary pharyngeo-oral air chamber (well illustrated by the vowel diagrams in Ladefoged 1962, 96–7; cf. also Catford 1977, 58). At its upper extremity, again, the pharyngeal cavity can also be physiologically delimited from the nasal cavity by the velum in contact with the naso-pharynx during plosive articulations, oral vocalic articulations, and oral, fricative, lateral, and rolled articulations, e.g. [p b V h j ɸ s ħ l r] (but not during *naso-oral* vocalic, fricative, lateral, and rolled articulations; e.g. [Ṽ h̃ s̃ l̃ r̃]); otherwise, the pharyngeal cavity merges imperceptibly with the nasal cavity in a single pharyngeo-nasal air chamber.

In fact it is only during velar ejective and injective articulations, and articulations with velar-and-glottal double plosion, [k' kˁ k͡ʔ], that the pharyngeal cavity can be said to be fully delimited physiologically by Pike's criteria from its neighbouring types of cavity, pulmonic, nasal, oral, and oesophageal.[8]

My own view is that Pike would have done well to have so defined the pharyngeal cavity as to have excluded the larynx, thus making the pharyngeal cavity entirely supra-laryngeal; for the larynx can easily be distinguished as a physiological unit of cartilage and bone, with its own musculature, enabling it to move upwards and downwards within the pharynx for a distance of approximately two centimetres (Heffner 1952, 25).

The pharynx, on the other hand, is bounded by the tongue (more specifically by the tongue root, or 'radix') as its forward boundary, with the pharyngeal wall as its rearward boundary. As a matter of nomenclature the pharyngeal is the only subcategory of lingual fricative to be named from both its active and passive articulators; for the uvular, dental, palato-alveolar, and other lingual fricatives are named after the passive articulator only, the place of articulation. If the rear wall of the pharynx had been distinguished by a term of its own, such as *fauces*, pharyngeal fricatives could have been named faucal fricatives, from the passive articulator, on the same terms as, for example, uvular fricatives and dental fricatives ([χ ʁ θ ð]), or, perhaps, as radico-faucal fricatives, on the same terms as dorso-velar fricatives (cf. Catford 1977 on 'faucal or transverse pharyngeal articulation' as 'the most common articulation of the pharyngeal approximants [ħ] and [ʕ]' (163), and on 'root or radix, which continues on down in front of the epiglottis' (144)). With such a change of name, to faucal or radico-faucal, possibly the pharyngeal sub-category of fricative, [ħ ʕ], would then have been more readily associated with the other sub-categories of lingual fricative, and dissociated from the laryngeal (or glottal) sub-category of fricative, [ɦ ɦ̥], in the production of which the tongue plays no part; for the friction feature of [ɦ] and [ɦ̥] is entirely due to the vocal cords within the arytenoid glottis, without distinction of active and passive articulator.

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[8] For purely physiological definitions of the laryngeal pharynx and the oral pharynx cf. Heffner 1952, 25–9; and for the larynx and the pharynx Catford 1977, 20.

Given such a dissociation of the pharynx from the larynx, laryngeal (and glottal) articulations would not have qualified for inclusion in the pharyngeal cavity; and [ħ] and [ʕ] would be classified as 'pharyngeal cavity' fricatives, while [ɦ] and [ɦ̥] would be assigned to the pulmonic cavity or to a further, and sixth, cavity, the laryngeal cavity (assuming, that is, that Pike's 'cavity' concept had been retained).

'Pharyngeal air-stream mechanism' My view that the status of the pharynx as a 'cavity', and the relations of the larynx to the pharynx, should be revised would, naturally, affect the name and description of one of Pike's three air-stream mechanisms, the pharyngeal. Since Pike defines the pharyngeal cavity as comprising the pharynx and the larynx as far as, and including, the glottis, the closed glottis as initiator of the 'pharyngeal air-stream mechanism' lies within the pharyngeal cavity; but if the larynx were to be excluded from the pharyngeal cavity, the initiator of the pharyngeal air-stream mechanism would have to be treated as being either within the pulmonic cavity or within a new cavity, the laryngeal, with the power of moving upwards and downwards within the lower part of the pharynx.

Further, if a pharyngeal cavity were no longer to be distinguished from the oral cavity, the larynx with closed glottis as initiator would be acting not merely on 'pharyngeal cavity' air but on air in a chamber comprising throat and mouth equally, e.g. [p' pˁ t' tˁ]; and only incidentally would that air chamber be confined to the pharynx, as in the production of a *velar* ejective or injective, [k' kˁ].

In either case the term 'pharyngeal air-stream mechanism' would cease to be appropriate; and Abercrombie's term 'glottalic', from the closed glottis within the larynx acting as initiator, would be preferable (Abercrombie 1967, 28–9).

'Combinations of major air-stream mechanisms' and pharynx air. Those combinations of air-stream mechanisms in which one of the component mechanisms is the pharyngeal would also be affected similarly by a re-consideration of the dimensions of the pharyngeal cavity and of its relations with the larynx; these combinations comprise: 'Pharynx mechanism plus pulmonic mechanism' (95–6), for implosives, e.g. [ɓɠ], 'oral mechanism plus pharyngeal mechanism' (98–9), for ejective and injective clicks, e.g. [ʗ' ʘ' $\overset{<}{\text{ʗ}}$' $\overset{<}{\text{ʘ}}$'], and 'oral mechanism plus pharyngeal mechanism plus pulmonic mechanism' (99), for implosive clicks, e.g. [ʗ͡ɠ ɔ̵͡ɠ]. Such combinations would be termed glottalic plus pulmonic, velaric plus pulmonic, and velaric plus glottalic plus pulmonic in Abercrombie's analysis, which does not distinguish 'cavities', and treats the pharyngeal fricatives [ħ] and [ʕ] on the same terms as oral fricatives (1967, 126), as they are treated in the I.P.A. chart.

The 'pharyngeal cavity' in the 'pulmonic air-stream mechanism'. Crucial action in the pharyngeal cavity but as part of the more general action of the pulmonic air-stream mechanism would also, of course, be affected by any attempt to restrict the pharyngeal cavity to the pharynx, by excluding that part of the larynx which includes the vocal cords and above, or by a more radical attempt to get rid of the 'cavity' status of the pharynx altogether. Pike describes the pulmonic air-stream mechanism as follows: 'the lungs acting as initiator may press *lung air* outward through the pharynx and mouth or nose (or some connected combination)' (89). Thus, this mechanism takes its name from the lungs as initiator, with due emphasis on lung air; and the crucial role of the larynx in modifying the lung air as it passes, or is prevented from passing, between the vocal cords is somewhat played down. Since Pike treats the vocal cords as part of the pharyngeal cavity, their voicing action, voice vibration versus non-vibration, and their glottal-closure action too, together with glottal friction, [ɦ] and [ɦ̥] (or [W]hisper), are all also to be treated as activities of the pharyngeal cavity; if, on the other hand, the pharyngeal cavity were taken to exclude the larynx, then these glottal activities would become pulmonic-cavity activities (or, possibly, the activities of an independent laryngeal cavity).

The pharyngeal cavity and the 'oral air-stream mechanism'. In my view the larynx and, therefore, the pharyngeal cavity as defined by Pike also function in the 'oral air-stream mechanism' (93–4), thereby calling into question Pike's treatment of this type of air-stream mechanism, e.g. [⊙ ʗ], as uncombined. He takes voiceless clicks such as 'bilabial egressive click stop' (94), [$\overset{<}{\odot}$], to be examples of the pure 'oral air-stream mechanism', uncombined with any other: 'only sounds produced by oral strictures may occur with this mechanism, since the pharyngeal and nasal cavities are completely outside it (except following velar release); nasalised or voiced types are achieved only in conjunction with the pulmonic mechanism' (93). This restriction results in voiced clicks, e.g. [⊙͡g ʗ͡g ʗ͡ŋ], being classified differently from voiceless clicks, e.g. [⊙ ʗ]: the former are treated as examples of 'oral mechanism plus pulmonic mechanism', a combination of two mechanisms, and the latter as examples of the uncombined, single, or pure 'oral air-stream mechanism', though the only difference between the two types of sound is to be found in the larynx, in its glottal activity.[9] For the former a pulmonic air-stream passes through the narrowed glottis under sufficient pressure to make the vocal cords vibrate; for the latter a pulmonic air-stream passes through the glottis in its wide-open, or breath, position without voice vibration. I see a contradiction in this difference in treatment, and should wish to classify voiceless clicks with voiced clicks as belonging equally to the category of 'oral mechanism plus pulmonic mechanism' (97–8). Indeed Pike himself writes: 'the vocal cords do not, of course, need to be vibrating for these combinations, so that the pulmonic contribution could be voiceless' (98); this would be the case in the production of a voiceless ingressive nasalized click, e.g. [⊙͡ŋ̊ ʗ͡ŋ̊], and should apply equally to a voiceless non-nasalized click, e.g. [⊙ ʗ].

This inconsistency in the treatment of voiced as opposed to voiceless clicks would appear more clearly if the voiceless clicks were to be symbolized as, for example, [⊙͡k ʗ͡k], on the model of the voiced plosive clicks, e.g. [⊙͡g ʗ͡g], and the voiced nasalized clicks, e.g. |ʗ͡ŋ ʘ͡ŋ|.

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[9] There are advantages in using Kelly's feature-based symbolisation, developed for Xhosa, over the I.P.A. symbolisation. In his system these three combinations of symbols would be represented as [⊙̬ʗ̬] for voiced plosive clicks and with, for example, [ʗ̃] for voiced nasalised clicks; consequently, [⊙ ʗ], for example, can continue to be used for voiceless plosive clicks, and [ʗ̥̃], for example, could be used for a (voiceless) breathed nasalised click, with [ʗ̤̃] for a glottal-fricative voiced nasalised click.

An I.P.A. symbol such as [ʗ͡g], for example, symbolizes velar closure twice, once in the click part of the symbol, [ʗ -], and once in the voiced velar plosive part of the symbol, [-g], simply in order to symbolize the feature voice, through [-g].

If Pike's examples of his 'oral air-stream mechanism', e.g. |ʘ ʘ͡Φ ʘ̌| (cf. 94), were to be reclassified, as I have suggested above, as belonging to the category 'oral mechanism plus pulmonic mechanism' the 'oral air-stream mechanism' category would cease to exist; and only two independent (or uncombined) types of air-stream mechanism would remain, the pulmonic air-stream mechanism and the pharyngeal air-stream mechanism.

2.2 Including the glottis within the 'pharyngeal cavity'

2.2.1 Lingual versus glottal

A major difference between the pharyngeal type of fricative and the glottal is that |ħ| and |ʕ| are lingual fricatives while |ɦ| and |ɦ̥| are glottal (and, therefore, laryngeal). In producing the former pair it is the tongue (more specifically, the tongue root, or 'radix'), as active articulator, that approaches the pharynx wall, as passive articulator, sufficiently to give rise to audible friction, while, in producing the latter, the approximating action of the vocal cords within the arytenoid glottis gives rise to the audible friction, without distinction of active and passive articulator.

2.2.2 Phonation

A further major distinction between pharyngeal and glottal fricatives had been to some extent anticipated in Pike 1943: 'oral quality is more basic than pharyngeal quality in that vowel type or timbre persists despite various glottalic or pharyngeal formations' (131). I agree with him as far as glottalic formations are concerned; and I note that all the examples he gives of difficulties that would arise if 'pharyngeal and oral strictures |were| treated as of equal function' are not pharyngeal but glottal: 'voiceless and voiced [u] would have to be placed in basically different categories instead of being considered varieties of the same vocoid with its form modified by voicing. . . . During a [u], friction at the glottis would leave the sound a vocoid, but labial friction would change it into a contoid' (131).

In Pike's favour one can say that it would certainly be awkward to have to treat vowels accompanied by glottal friction ([V̤]) as contoid rather than vocoid simply because of an undue insistence on friction as a criterion of the contoid category in all circumstances, even when it occurs in the glottis; and the same is equally true, or more so, of whispered vowels ([V̤̥]). On the other hand I would say that it is just as awkward to have to treat the pharyngeal (and, therefore, lingual) fricatives [ħ] and [ʕ] as vocoids simply because of an undue insistence on friction in the pharyngeal cavity as a criterion of the vocoid category even though this voiceless and voiced pair of fricatives are lingual, just as lingual as [χ ʁ] and [θ ð].

In other words, Pike has anticipated the major phonetic category *phonation* as regards *glottal* fricatives, [ɦ W(hisper)] (141); it is unfortunate that he has blurred the distinction by including them in the same cavity, the pharyngeal cavity, as [ħ] and [ʕ]. Catford 1964, on the other hand, and Catford 1977, define phonation as 'any relevant activity in the *larynx* which is neither initiatory nor articulatory in function' (1977, 16) [my emphasis]. As phonatory stricture types he includes: voiceless, whisper, voice, creak (1977, 95–8; he now excludes, as an 'articulation', or as a 'concomitant of initiation', glottal stop (98); but cf. 1964, 30–3); he also distinguishes four locations: full glottal, anterior (formerly arytenoid), posterior (formerly ligamental), and ventricular (102–4).

Paradoxical though it may seem, my reason for examining Pike's treatment of friction in the pharynx in such detail, and rather critically, in this short tribute to the wide phonetic interests of my former colleague Carnochan, is the very high regard that I have developed over the years for *Phonetics*, especially when one takes into account its year of publication, 1943, forty-seven years ago, before the instrumental revolution. So sound is it, and so forward-looking, that it irks me to find that it falls short of perfection.

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A STUDY OF QUANTITY IN MESTREECHS

L. van Buuren*

1 Introduction

Mestreechs is the dialect spoken in the city of Maastricht. This Roman city, Mosae Traiectum, is the Southernmost city of the Netherlands and the administrative and cultural centre of Dutch Limburg. It is also situated in the area, comprising the Rhineland, Dutch and Belgian Limburg and Luxemburg, known for its tonal accents, the so-called 'Stoszton' and 'Schleifton'. These terms may be translated into English as the Hard Tone and Slurred Tone.

Surprisingly, we found no trace of any tonal accents in the city dialect of Maastricht, although they are very much in evidence in the surrounding area. For various reasons, the pitch element is absent in Mestreechs and all that is left is a contrast in duration or quantity. An example of this is [bʌl] — *ball (dance)* versus [bʌːl] — *ball (round object)*. Taking our cue from Professor Carnochan's (1951) article on Hausa, it seemed therefore appropriate to call this paper A Study of Quantity in Mestreechs. Perhaps it may contribute a little to our

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understanding of phonetic and phonological processes, as the work of the Prosodic School has done to such a considerable extent.

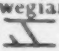
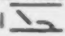
Since it is not very appropriate to speak of hard and slurred 'tones' in Mestreechs, I propose to use less phonetically specific terms, viz. H prosody and S prosody. In phonological transcription, H will be shown by an acute accent, thus bʌ́l — *dance*, and S will be shown by a tilde, thus bʌ̃l — *round object*.

The distinction between these two prosodies seems to have arisen over a thousand years ago. Indeed, it is quite possible that it was originally in the first place a quantitative distinction, and that the associated pitch distinction never struck root in Maastricht. However, the more likely explanation is that the melodic distinction has gradually disappeared from the rather 'refined' city dialect under the influence, since the 17th century, of 'Hollands', i.e. the dialect of the province of Holland which was later to provide the foundation for Standard Dutch. In this respect, Maastricht Limburg is comparable with Edinburgh Scots, which has also been under greater influence from the prestige form of the language than the surrounding dialects. All one can say now is that the melodic feature has been absent for as long as anyone can remember. Houben's (1905) grammar of Mestreechs mentions only quantitative contrasts and says nothing about any tonal differences.

The reader may wonder why we did not concentrate on one of the surrounding dialects. After all, length differences in the order of, say, one-tenth or one-twelfth of a second are much more difficult to perceive and to study for an outsider than pitch differences. Indeed, for a time, we found ourselves almost completely unable to hear any of the H/S contrasts at all, which our native informants insisted they were making, and we sometimes felt like throwing in the towel. But there is such a thing as professional pride and one does not like to be defeated by statements like "We will not indicate the difference between the hard and slurred tones as it would merely clutter up the texts. The Maastricht speaker will get the word right automatically, and the non-Limburger is bound to get it wrong whatever he does."

(Dumoulin and Coumans, 1986, p.68).

More seriously, though, the fact remains that Mestreechs is a fully-fledged language which is *learnt* from the cradle by native speakers. As a linguist one would like to find out how it is patterned in the native speaker's mind, and one does not walk away from it because one thinks it is unreasonably subtle or impure. Finally, Mestreechs has sufficient prestige nowadays to be taught at the local 'Volksuniversiteit', mainly to new residents who wish to integrate properly with the local population. One day, we would indeed like to produce a description of the phonetics of Mestreechs for those wishing to learn the dialect. But then we do have to sort out, first of all, how the H and S prosodies are realised and distributed in the language.

A great deal has been written in German and Dutch on the 'Rheinländische Stosztöne und Schleiftöne', mostly from a historical perspective. The phenomenon is of course quite interesting. The only parallel in the Germanic languages is in Norwegian and Swedish, which exhibit tonal contrasts of the type ʌksəl  — *axle* versus ʌksəl  — shoulder, and in Danish, which exhibits voice quality contrast in [hɔn] — *she* versus [hɔʔnʔ] — *dog*. .

The major authority on the subject is undoubtedly Theodor Frings. Two of his publications, Frings (1913) and Frings (1916) seem quite representative of the literature as a whole.

Frings (1913) is perhaps the more interesting of the two, as it is basically concerned with stating the realisation and, in diachronic terms, the distribution of H and S in his own dialect of Dülken, a small German town about 15 kilometres from the Dutch border.

The 1916 publication, entitled *Die rheinische Accentuierung*, casts its net much wider, surveying in detail the state of research in the whole of the H/S area, and speculating at considerable length on the nature and causes of the phenomenon.

Although Frings actually did a little research in Panconcelli-Calzia's phonetics laboratory in Marburg in 1908, his phonetic observations are extremely poor. The two examples discussed at some length are stīf — *stiff (neutral)* and stíf — *stiff (feminine)*. From a kymogram in Frings (1913) it appears that the S form has a total duration of approximately 150 centiseconds and the H form only half of that, about 75 centiseconds. All four elements [s, t, i, f] are longer in the S form, but especially the vowel. Although we have heard quite considerable 'lengthenings' of this kind ourselves, one suspects that Frings may have exaggerated the difference a little when he made the kymograms. One of these days we shall have to pay a visit to Dülken to find out for ourselves.

Nevertheless, the length feature is undoubtedly the most striking and most constant feature. It seems to us that this is indeed also reflected in the terms Stosston (not used by Frings) and Schleifton. Oddly enough, this quantitative distinction is subsequently virtually ignored, not only by Frings but by most of his successors as well.

The second most noticeable feature, pitch, also receives the most cavalier treatment in the literature. In the varieties where a pitch difference occurs the difference between H and S is as clear as the tonal contrast in Swedish and Norwegian, at least when the words are said in isolation. Yet, apart from mentioning it, nobody ever seems to have made any attempt to actually describe the pitch movements. As it happens, Frings and his successors concentrate almost exclusively on a third and notoriously dubious and elusive feature, viz. that of stress or force. This is regarded as the primary phenomenon, and it is therefore hardly surprising, in our view, that it leads to the most complicated and esoteric theories about 'accents' with one peak ('eingipflig'), two peaks ('zweigipflig'), which may be checked ('stark geschnitten') or unchecked ('schwach geschnitten'), and so on.

In Mestreechs, the phonetic realisation is quite straightforward albeit extremely subtle. It is simply that the S variants are minimally longer in their vowel and following homo-syllabic consonant (if any) than the H equivalent. Moreover, the difference is not made in unstressed positions in the sentence. Also, with a few vowels, noticeably *ɛɪ*, œɪ, ɔʊ the realisation is more diphthongal if the prosody is H and more monophthongal if it is S.

A phonetic re-investigation of some of the data presented by Frings and others certainly seems to be called for if we want to gain more insight into the origin and development of tonal distinctions in these dialects and in language in general. I would suggest that the role of timing or quantity has been crucial.

Although Frings and others do not say so in so many words, it appears from their examples that the H/S opposition operates only in syllables having primary and secondary word-stress, and certainly not in syllables containing /ə/. In effect this means that the vast majority of words have only one H or S. Only longer words like kɔmpləmɪnt *compliment* may in principle have two. In Mestreechs, even such words tend to have only one prosody, located on the syllable with the primary stress. Only in compounds like nɒɒdəmidaŋ — *afternoon* can there be two. The prosody is therefore developing into a prosody of morphemes, perhaps of words, rather than syllables.

The standard theory regarding the origin of the H/S distinction, again according to Frings, may be summarised as folllows.

At some unspecified time, perhaps around the fifth or sixth century, all or most long, non-final syllables were 'hardened' or 'sharpened' if followed by voicing. It seems that this hardening or sharpening ('Schärfung') means essentially 'shortening'. Frings does not quite put it this way: his formulation is in terms of sharpening of non-short vowels followed by a voiced consonant plus vowel and of short vowels before nasals and liquids followed by the same. Some hypothetical examples to make this clear: *stĭvə > *stívə — *stiff*, *bĕɪnə > *béɪnə — *bones, legs*, *lў̆zə > *lýzə — *lice*, *stĕrvə > *stérvə — *starve, die*, *vrɔ̆nə > *vrɔ́nə — *woman*, *hʌ̆ndə > *hʌ́ndə — *hands*. Note that H is marked. All words that did not develop H kept S, i.e. all words with short vowel in open syllable such as *mʌ̆nə — *men*, with intervening voiceless consonant such as *wĕɪtə — *to know*, and all words ending in a stressed syllable, such as *bĕɪn — *bone, leg*.

Up to this point of course, forms with H and S were in complementary distribution, although many nouns and verbs would have S in the singular and H in the plural forms, e.g. *bɛ̄ɩn — bɛ́ɩnə — *bone*, *stɛ̄rv–stɛ́rvə — *starve, die*. Others had S throughout, e.g. *mʌ̄n–mʌ̄nə — *man*, *wɛ̄ɩt–wɛ̄ɩtə — *to know*. But this situation changed drastically when, at a later stage, many vocalic endings were dropped. This led to minimal pairs like Frings' stīf–stíf, and it also explains some present-day Mestreechs forms like bɛ̄ɩn–bɛ́ɩn — *bone, bones*, lūz–lœ́ɩz — *louse, lice*.

Subsequently, Frings discusses some later developments which further affected to some extent the distribution of H and S. Unfortunately, however, all this knowledge hardly helps to explain most of the patterns of distribution of the prosodies in present-day Mestreechs.

We have just seen that S is generally regarded as the unmarked prosody and H as the marked one. From a synchronic point of view this certainly seems to be the case in most of the present-day H/S dialects, if only because most words take S. But in Mestreechs H has become the unmarked prosody, and that has created, to use a fashionable idiom, a whole new ball-game. Perhaps we should also hesitate to accept the view that, as Frings says, S was the unmarked prosody in a diachronic sense.

To all other speakers of German and Dutch, words with H sound quite 'normal', whereas words with S sound typically Rhineland or Limburg, because of their unusual stretching and/or sing-song pitch pattern. One would have thought that the S prosody was a development peculiar to this area, and not the H prosody. According to the established theory, however, there was a shortening of H syllables like bʌ́l so that it became just as short as in other types of Dutch or German. But that does not explain at all how S words like bʌ̄l became very much longer than in other dialects. Surely there is still a great deal of explaining to be done by historical linguists.

In any case, H is now the unmarked prosody in Mestreechs. One suspects again that this has come about as a result of 'Hollands' influence; for one thing, all words that are felt as 'Hollands' or 'unfamiliar' or 'technical' are usually said with an H prosody, which is generally regarded as very close to the 'Hollands' pronunciation. This process has been going on for the last 350 years.

Another consequence of this shift from S to H being the unmarked prosody was a wholesale movement of words with short vowels into the H class and of words with long vowels into the S class. Of course, we were not aware of all this when we first approached the Maastricht dialect, innocently armed with what turned out to be very misleading information. For a time it seemed to us that there were hardly any patterns at all, so that S and H had to be learned with individual lexical items like, say, the tones of tone-languages. The following exposé tries to show that there are patterns; however, not one simple monosystemic one, but a variety of patterns for different areas of the phonology and probably also for different areas of the grammar and lexicon, integrated or not integrated with each other in a number of different ways. To solve the problem, in other words, one needs a polysystemic approach, in the Firthian sense. In the end, however, we must allow for a number of unpredictable 'exceptions' or lexically determined occurrences of H and S. The overall picture, which is still tentative and incomplete, is not as neat and pretty as the book-keeper in us, Firthian or otherwise, would like it to be. But then people do not always behave as book-keepers want them to behave. People tend to be rather messy while at the same time struggling to keep things in some sort of order. One should not be surprised if this human flaw is reflected in the organisation of linguistic patterns.

2 Overall patterns in the phonology of Mestreechs.

2.1

The consonant inventory may be shown as follows:

p	b	f	v	m			w, j, h
t	d	s	z	n	l	r	
k	g	x	ɣ	ŋ			

This is rather like most varieties of Dutch, with, however, some important differences. Most kinds of Dutch have lost /g/. In Mestreechs it has been preserved, to a limited extent, in words such as brøg-brøgə — bridge(s). Especially in Northern varieties of Dutch the contrast between voiced and voiceless fricatives has almost disappeared, and this tendency is now affecting Southern accents as well. Generally speaking, however, the contrasts are still operative in Mestreechs.

On the other hand, there is one related feature that has affected all Dutch and German dialects, viz. that of word-final devoicing or 'Auslautsverhärtung', whereby word-final / b, d, g, v, z, ɣ / sound like / p, t, k, f, s, x/. However, the distinction is still maintained, more or less, in voiced surroundings. Therefore we shall write kʌt-kʌtə — *cat, cats*, but bʌd-baadə — *bath, baths*, even though bʌd is phonetically [bʌt]. Similarly hɛɪs-hɛɪsə — *hoarse* versus *vɛɪz-vɛɪzə* — *dirty*, even though vɛɪz is phonetically [vɛɪs]. It should be kept in mind that H-prosody only developed in voiced surroundings, not before voiceless consonants, so it is important for the statement of H/S occurrence to make this distinction in our transcriptions.

The vowel system in stressed syllables may be set out as follows:

Short				Medium				Long			
A1	ə	ɵ	ᴖ	B	i	y	u	E	aa	œœ	ɒɒ
A2	ɪ	ʏ	ɔ	C	ee	øø	oo				
A3	ɛ	ʌ		D	ɛɪ	œɪ	ɔu				

To those familiar with the Cardinal Vowel system the symbols employed give a reasonable indication of the phonetic qualities. As a result of 'Umlaut' or i-mutation, Mestreechs has a rather large number of vowels. There are no parallels to the A1 vowels in other varieties of Dutch.

2.2

Our investigation into the distribution of H and S prosodies was restricted to nouns, verbs and adjectives, and the findings may be briefly summarised before we proceed to a more detailed examination of a selection of these word classes.

2.2.1

In E-words, i.e. those with long vowels in the stressed syllable, the H/S distinction seems to be on the way out. Only one of our spokesmen insisted that he would have H in a Hollands word like **stáatə** — *(states-general)*. Apart from that there were only one or two dubious cases of H. It was generally agreed that all other E-words took S.

2.2.2

In B, C and D words the H/S distinction is fully operative. We discovered two important patterns which, for want of a better term, will be referred to as the open-syllable rule and the whole-syllable rule.

Open syllable rule. Word medial open syllables like **zĕekər** — *certain*, **wēιɣərə** — *to refuse*, generally take S. As with other such 'rules' there are a number of exceptions. A word may take H if it is derived from or associated with another word or root with H, as in **hóokəɣ** — *angular* < **hóok** — *hook*. A 'Hollands' or unfamiliar word may take H, e.g. **œ́ιjər** *udder*. Some small closed classes of 'irregular' nouns, adjectives and verbs follow different rules, e.g. **zə vlóoɣə** — *they flew*.

Whole syllable rule. All other syllables, i.e. closed medial and closed or open final ones are referred to as 'whole syllables'. These generally take S if they end in a voiceless stop or fricative, otherwise they take H, e.g. sjēep — *ship*, vrɔu — *woman*. Again there are the same sort of systematic exceptions and a number of lexical exceptions as well. These patterns have only the most tenuous relation to the diachronic rules given by Frings.

As suggested earlier, there is within each of the B,C and D groupings a small closed class of nouns and adjectives, mostly ending in laterals and nasals, which we may call SHH words. They are not unlike irregular plurals in English, except that the classes are larger. Also these forms appear to be very old and traditional and much closer to Frings' descriptions than most other items. One such adjective is stiv — *stiff*, mentioned by Frings; two others are brūn — *brown* and wiz — *wise*. These adjectives take S predicatively and in the neuter singular, H in all other cases, thus: ə brūn/wiz keend, ən brɔʊn/wɛɪs vrɔʊ, ənə brɔʊnə/wɛɪzə māan.

In nouns of this type the singular generally takes S and the plural and diminutive H, thus; bɛɪn–bɛɪn–bɛɪnsjə — *bone, leg*.

For reasons of space we shall discuss in some detail only the C-words and merely indicate where the B-words and D-words differ.

2.2.3

We have just seen that E-words can take only the S prosody. In B, C, and D-words the distribution of the S and H prosodies is determined to a very large extent by the whole-syllable and open-syllable rules and by membership of certain classes of strong (SHH) nouns, verbs and adjectives. In A-words the patterning is completely different.

As a general rule we can say that the opposition between S and H does not operate in A-words: with a few exceptions they all take H, e.g. lʌs–lʌstə – lɛskə — *burden*. It is however these 'few exceptions' that demand all our attention. The H/S contrast does not operate if the A-vowel is followed by a 'liquid or nasal', i.e. -l, -r, -m, -n, -ŋ with or without other Cs, and in one or two other cases. As with B, C and D words there are also small classes of SHH nouns and adjectives.

One extra complication is that, historically, an epenthetic or 'svarabhakti' vowel has developed between -l, -r and a following labial or velar consonant, as in **vɔ̄lək-vɔ̄ləkə- vɔ̄ləkskə** — *folk(s), nation*, **wə̄rəm-wə̄rəm-wə̄rəmkə** — *worm*. Essentially, these follow the same pattern as words without svarabhakti, such as **hʌ̄ls-hɛls-hɛlskə** — *throat*, so it is appropriate to take them together. A further complication is that the native learner has no way of knowing whether a -ə- between l, r and a following labial or velar is indeed historically epenthetic or 'original' as in **tə̄ləp-tə̄ləpə-tə̄ləpkə** — *tulip*. Therefore we shall treat them all on a par, as indeed the native speaker seems to do, using the term 'svarabhakti' for all such əs.

We shall deal in detail with words having A-vowel plus nasal, only briefly mentioning relevant points in A-words with -l or -r.

3 Words with the C-vowels ee, øø, oo, in detail.

3.1 C-nouns.

So far we have collected only 3 nouns in the SHH class, ending in rd and ɣ: pēerd-péerd-péerdsjə — *horse*, and similarly bēerd — *beard*, wēeɣ — *road*.

Of 41 monosyllabic nouns ending in a voiceless stop (or affricate) 26 take S, e.g. **nø̄øt** — *nut*, sjēep — *ship*, kōok — *cook*. This may be regarded as the unmarked category. The other 15 take H, e.g. róot — *soot*, wéek — *wing, sail*, bóok/bǿøk — *book(s)*, kóok — *cake, biscuit*. Apart from one or two 'foreign' words, none of these have any distinguishing characteristics so they have to be learned individually.

All five words ending in r + C have the S prosody, e.g. vēers — *verse*. But those ending in r are generally H, e.g. méer — *mum*, dǿør — *bull*, bróor — *brother*. About one in four, however, are marked, having S, e.g. mēer — *lake*, dø̄ør — *door*, spōor — *track, railway*. This time, the S-prosody must be learnt with the individual words, as they do not seem to form a special class in any other respect.

Of some 40 other monosyllabic words, the majority take H, only 8 taking S. Most of these end in ɣ, the rest in l and n, e.g. trōoɣ — *trough*, zōon — *sun*, spø̄øl — *game*, the latter derived from or associated with the verb spø̄ølə — *to play*.

Among C-nouns with non-final stress we collected about 18 examples with closed syllables like wéeldə, 8 of them diminutives of E-nouns like bléedsje < blāad — leaf. All of these take the H-prosody. Only diminutives of C-nouns with S keep the prosody intact, thus mēerke < mēer — *lake*. It seems that non-final closed syllables follow the same pattern as final (closed and open) syllables, i.e. usually S if the syllable ends in a voiceless stop or -rC, and H otherwise, allowing for loanwords, derivations and 'exceptions'. Since the syllables concerned are usually closed, but can be open if word or stem final, we decided to call this the 'whole syllable' rule or pattern.

Among nouns with open non-final syllables we found 28 with S, and 9 with H. Those with S can be said to follow the 'open syllable' pattern. Those with H prosody can generally be 'explained' as being predictable 'derivations' from monosyllables, e.g. spǿøl > spǿøliŋ — *rinsing*, wéek > wéeke — *wings, sails*, or loanwords from French or Standard Dutch, such as méetər — *metre*. Two 'unpredictable' cases are wéerəld — *world* and wóokər — *usury*.

3.2 C-verbs, weak.

A typical weak verb is *to rinse*: spǿølə - spǿøldə - ɣəspǿøld. ix spǿøl - də spǿøls - her spǿølt - ver spǿølə - ɣer spǿølt - zi spǿølə
Note that the stressed syllable is open only in the infinitive and 1st

and 3rd person plural, but closed in all other forms, including the imperative. We collected 24 such verbs, all with H prosody, and 4 with S prosody. The latter included the 'unpredictable' **spø̄ølə** — *to play*, but the other three had stems ending in a voiceless stop, such as **stōokə** — *to stoke*. It seems that here, too, the whole syllable pattern is in operation, being extended also to the open syllable forms.

Some weak verbs, like **rēekənə** — *to reckon*, **zø̄ømərə** — *glean ears of wheat*, have of course an open stressed syllable in all their forms. All those encountered so far have an S-prosody throughout, in agreement with the open syllable rule.

3.3 C-verbs, strong.

There are at least three classes of strong verbs with C-vowels in all or some of their forms:

1.	vléeɣə	vlóoɣ	vlóoɣə	ɣəvlōoɣə	də vlœ́ʏxs	her vlœ́ʏx	*to fly*
	sléetə	slōot	slōotə	ɣəslōotə	də slʏ́ts	her slʏ́t	*to close*
2.	sprēekə	sprɒ̄ɒk	sprɒ̄ɒkə	ɣəsprōokə	də spríks	her sprík	*to speak*
3.	ɣēevə	ɣɒ̄ɒv	ɣɒ̄ɒvə	ɣəɣēevə	də ɣífs	her ɣíf	*to give*

The large majority of these forms have an S. In the present singular 2nd (shown) and 3rd ps. sg. and 2nd ps. pl. many verbs have shortened forms. However, this is probably better regarded as a matter of vowel alternation than as H/S alternation.

All past participles have open syllables and, not surprisingly, all seem to have S, in agreement with the open syllable rule. In classes 2 and 3 all other C-syllables, both open and closed, follow the same pattern. This is the opposite of what we saw in 3.2. Again, it is not 'illogical' that the rule is extended, since closed syllables with C vowels are in such a minority, being virtually restricted to 1st ps. sg. and imperative sg.: (ix) ɣēev — *(I) give*.

Only in class 1 do we find both H and S prosodies in C-syllables.

The present tense and infinitive always take H. The preterite takes either H or S, apparently in agreement with the whole syllable rule. So far, we have found no exceptions.

These arrangements, which seem quite chaotic at first sight, are indeed complicated, but not without method. We feel that this kind of patterning gives a good indication of the complexity of linguistic organisation in the human brain, and should be grist to the mill of any Firthian phonologist.

3.4 C-adjectives.

As with nouns, we must again first set apart an SHH class, although I have found only two examples so far, viz. sjēel - sjéel - sjéelə - sjéeldər - sjéelstə — *cross eyed*, and similarly ɣēel — *yellow*. Note that the contrast is also maintained in nominal derivatives: ən sjéel is *a cross-eyed woman* and ə sjēel is *a cross-eyed child*.

The other end-stress adjectives divide on the same lines as nouns. We found 19 examples of H, including other words in -eel, such as orizjinéel — *original*. This group also includes the 'unpredictable' voiceless stop words déep — *deep* and zǿøt — *sweet*.

Of the 6 S-words collected, three end in rC and two in voiceless stop or affricate, so these can be regarded as the unmarked cases. In the word kēens — *childish* the S could perhaps be ascribed to the nasal+C ending or otherwise to the association with kēend — *child*.

In adjectives with an open stressed syllable we found 18 instances of S, both in derived and non-derived forms like ōopə — *open*, dēeɣələk — *solid*. Although, by the open syllable rule, one would expect S to be the unmarked possibility in open syllables we found an equal number of H's. These, however, were nearly all loanwords like vróolək — *jolly* and derived forms like hóokəx — *angular* < hóok — *hook*, ɣóodəx — *good-natured* < ɣóod — *good*, and ɣəvǿøləx — *sensitive* < vǿølə — *to feel*. The only H form that could not be accounted for in this way is jøødəx — *youthful*, which we would associate with jāɐx — *youth*.

3.5 Some notes on words with B-vowels: i, y, u.

The patterning is very similar to that in C-words, and we shall only mention a few characteristic features.

We found the following 7 SHH nouns, ending in -z, -n, and -r, which must be set apart: prīz – prɛ́ɪzə – prɛ́ɪskə — *prize*, mũz – mœɛɪz – mœɛɪskə — *mouse*, lũz – lœ́ɛɪz – lœ́ɛɪskə – *louse*, wīn – wɛ́ɪn – wɛ́ɪnsjə — *wine*, kənīn – kənɛ́ɪn – kənɛ́ɪnsjə — *rabbit*, mũr – mér – mérkə — *wall*, vỹr – vér – vérkə – *fire*.

With nouns ending in -r the division is not clear-cut. There were 6 (unmarked?) H-words like múr — *Moor*, úr — *hour*, sjír — *scissors*, and 4 (marked?) S-words: spīr — *muscle*, zīr — *bagatelle*, tũr — *tour*, stỹr — *steering-wheel*; also one (unmarked) S-word ending in -rC, viz. tũrt — *tart, cake*.

There is essentially only one class of strong verbs involving B-vowels, thus:

blīvə	bléev	bléevə	ɣəblēevə	də blɛ́ɪfs	— *to stay*
krũpə	krõop	krõopə	ɣəkrõopə	də krʏ́ps	— *to crawl*

As can be seen, the past participle has a C-vowel and takes S in agreement with the open syllable rule. The preterite also has a C-vowel and takes S or H according to the whole syllable rule. This is exactly like class 1 of the C-verbs. All other forms with B-vowels take S.

We found 6 SHH adjectives, ending in -v, -z, -d and -n. They are: stīv — *stiff*, ɣrīz — grey, wīz — *wise*, wīd — *wide*, fīn — *fine*, brũn — *brown*. They all have D vowels in the H forms, thus: ə brũn/wīz kẽend   ən brɔ́ʊn/wɛ́ɪs vrɔ́ʊ   ənə brɔ́ʊnə/wɛ́ɪzə mãan. Words with similar endings also occur in the H class, e.g. vı́f — *active*, but not, apparently, in the S-class. From a learner's point of view, this would suggest a two-way rather than a three-way division of adjectives with these endings.

3.6 Some notes on words with the D vowels: *ɛι*, œι, ɔʊ.

We collected 9 SHH nouns, one ending in -v, three in -*ɛι*n and five in -ɔʊm: wɔ̄ʊv - wœ́ιv - wœ́ιfkə — *wolf*, bɛ̃ιn - bɛ́ιn - bɛ́ιnsjə — *leg*, stɛ̃ιn - stɛ́ιn - stɛ́ιnsjə — *stone*, trɛ̃ιn - trɛ́ιns - trɛ́ιnsjə — *train*, drɔ̄ʊm - drœ́ιm - drœ́ιmkə — *dream*, bɔ̄ʊm - bœ́ιm - bœ́ιmkə — *tree*, zɔ̄ʊm - zœ́ιm - zœ́ιmkə — *seam*, tɔ̄ʊm - tœ́ιm - tœ́ιmkə — *bridle*, strɔ̄ʊm - strœ́ιm - strœ́ιmkə — *stream*. The last two now also have the more modern regular plurals tɔ̄ʊmə and strɔ̄ʊmə, which seems to indicate that the SHH class is dwindling.

It appears that we must also recognise an HSH class. This looks like a fairly recent development, perhaps arising from a mixture of older and newer forms. These are the examples found: bəɣɛ́ιn - bəɣ̄inə - bəɣɛ́ιnsjə — *beguine, lay sister*, rəzɛ́ιn - rəzīnə - rəzɛ́ιnsjə — *raisin*, vɛ́ιɣ - vīɣə - vɛ́ιxskə — *fig*, ɔ́ʊɣ - ɔ̄ʊɣə - œ́ιxskə — *eye*,

dɔ́ʊm - dūmə - dœ́ιmkə — *thumb*, prɔ́ʊm - prūmə - prœ́ιmkə — *plum*, dɔ́ʊv - dūvə - dœ́ιfkə — *dove, pigeon*, drɔ́ʊv - drūvə - drœ́ιfkə — *grape*. The isolated example péer - pēerə - péerkə — *pear* which we found among the C-nouns clearly also belongs to this class. It is interesting to see that five out of these nine words are the names of fruits, but that must be a coincidence.

Weak verbs behave according to the whole syllable rule, like their C counterparts, thus: slɛ̃ιpə - slɛ̃ιpdə - ɣəslɛ̃ιp - də slɛ̃ιps — *to drag*, sjœ́ιlə - sjœ́ιldə - ɣəsjœ́ιld - də sjœ́ιls — *to shelter*.

Only in verbs with the stem ending in a vowel do we fail to see any pattern so far; cf. vréιjə - vréιdə - ɣəvréιd — *to court*, with H throughout vs. drε̄ιjə - drε̄ιdə - ɣədrε̄ιdə — *to turn*, with S throughout.

We found 8 SHH adjectives in our data, ending in -V, -l, -v and -d: trɔ̄ʊ — *true, faithful*, lœ̄ι — *lazy*, vrε̄ι — *free*, stε̄ιl — *steep*, vœ̄ιl — *foul, dirty*, sjε̄ιv — *slanted, askew*, dɔ̄ʊv — *deaf*, brε̄ιd — *broad*. Some of these contrast with H forms, such as blɔ́ʊ — *blue*, nœ́ι — *new*, bléι — *glad*, véιl — *mercenary*.

4 Words with the A-vowels: ɘ, ɵ, ○ — ɪ, ʏ, ɔ — ε, ʌ.

As explained in 2.2.3, the prosodic contrasts operate only in such words if the A-vowel is followed by a 'liquid or nasal', i.e. -l, -r, -m, -n, -ŋ, with or without other Cs, and in one or two other isolated cases. We shall deal in some detail with words having A plus N-set (i.e. a nasal or a consonant cluster containing a nasal) and eclectically with those having -l or -r after the vowel.

4.1 A-stems ending in nasal.

4.1.1

A-nouns with stem ending in -m, -n, -ŋ, take H prosody in virtually all their forms, e.g. zín - zínə - zínəkə — *sentence*, vlʌ́m - vlʌ́mə - vlέmkə — *flame*, trέm — *tram*, zʏ́n — *sin*, zɔ́n — *sun*, tɔ́ŋ — *tongue*, slʌ́ŋ — *snake*. Only two exceptions were found, both belonging to the SHH category: zīn - zínə - zínəkə — *sense, feeling*, and pīn - pín - pínəkə — *pin*.

4.1.2

A-adjectives with stem ending in nasal likewise take H in all their forms, e.g. dén - déna - dénər/déndər - dénstə — *thin*. We found only one exception with SHH, viz. mīn - mín - mínə - mínər - mínstə — *mean, despicable*. This is probably a fairly recent derivation from the adverb mīn — *less, little, minus*. In passing, we may mention that the preposition īn — *in* and the conjunction ɛ̄n — *and* both take S as well.

4.1.3

A-verbs with stem ending in a nasal show more complicated patterns. Again, none have S throughout, most have H throughout. This applies to both weak verbs like dʌ́m - dʌ́mdə - ɣədʌ́md - ix dʌ́m - də dʌ́ms — *to play at draughts* and to strong verbs like vríŋə - vrɔ́ŋ- vrɔ́ŋə - ɣəvrɔ́ŋə - ix vríŋ - də vríŋs - *to wring*. But a few strong or irregular verbs show a mixture of S and H forms. These include zīŋə — *to sing*, sprīŋə — *to spring, jump*, brīŋə — *to bring*, hʌ̄ŋə or hāaŋə — *to hang* and vʌ̄ŋə or vāaŋə — *to catch*. The first of these, for instance, is conjugated as follows: zīŋə - zɔ̄ŋ- zɔ̄ŋə — ɣəzɔ̄ŋə, present tense ix zíŋ- də zíŋs - her zíŋk - ver zīŋə - ɣer zíŋk - zə zīŋə, imperative zíŋ - zíŋk. In these words, then, S appears in the infinitive, preterite, past participle and 1, 3, plural present.

Historically, -ŋ in these words derives from -ŋg, which 'explains' at least some of the S forms; cf. bīndə - bɔ̄nd - ɣəbɔ̄ndə - də bīnds — *to bind* in 4.2.3.

Quite unpredictable, however, are the S prosodies on A syllables in kɔ̄ʊmə - kɒ̄ɒm - ɣəkɔ̄ʊmə - ix kʌ́m - də kʏ̄ms - her kʏ̄mp — *to come*, and nʏ̄mə - nɒ̄ɒm - ɣənōomə - ix nʏ́m - də nʏ́ms - ver nʏ̄mə — *to take*. These must be learnt as 'exceptions' to the general patterns.

4.2 A-stems ending in nasal plus consonant.

4.2.1 A-nouns with stem ending in -NC.

We collected over 80 of these. There are none with svarabhakti as in mə̄lək — *milk* or wɛ̄rək — *work*. About 60, all but one or two ending in N+voiceless plosive or fricative, take S in all their forms, e.g. lʌ̄mp - lʌ̄mpə - lɛ̄mpkə — *lamp*, and similarly pɔ̄mp — *pump*, pʏ̄nt — *point*, prɛ̄nt — *print*, səmīnt — *cement*, vīŋk — *finch*, stʌ̄ŋk — *stink*, sprʏ̄ŋk — *spring, source*, prīns — *prince*, pɛ̄ns — *belly, tripe*. There are just a few with a (potentially) voiced consonant, e.g. rīnd - rīndər — *cow, cattle*, vərbɔ̄nd - vərbɔ̄ndə — *union, bond*, and, at least for some speakers, spɔ̄nz - spɔ̄nzə rather than spɔ̄ns - spɔ̄nsə — *sponge*.

However, the majority of those with (potentially) voiced consonant after the nasal make up the SHH group. This is not immediately obvious, as word-final b. d. g. v. z. ɣ are pronounced (and often spelled!) like p. t. k. f. s. x, or may have dropped out altogether. But the following dozen nouns ending in -nd seem to show quite clearly that there is such a pattern: tʌ̄nd - tʌ́n - tɛ́nəkə — *tooth*, hʌ̄nd - hʌ́n - hɛ́ndsjə — *hand*, rʌ̄nd - rɛ́n - rɛ́ndsjə — *edge*, brʌ̄nd - brɛ́n - brɛ́ndsjə — *fire*, lʌ̄nd - lɛ́n - lɛ́ndsjə — *land, country*, bʌ̄nd - bɛ́n - bɛ́ndsjə — *band, strip*, wʌ̄nd - wɛ́n - wɛ́ndsjə — *wall*, strʌ̄nd -

strέn/strʌ̃ndə - stréndsjə — *beach*, vərbʌ̃nd - vərbέn/vərbʌ̃ndə - vərbéndsjə — *bond, union*, vrʏ̃nd - vrʏ́n - vrʏ́ndsjə — *friend*. Apparently, the pattern is still productive: one informant spoke of the strέn of the Costa Brava, although the concept of a beach must be traditionally quite unfamiliar to the citizens of Maastricht.

The d in all these examples is phonetically [t], but phonologically, and one may suggest, psychologically /d/, for various reasons: (i) there are some alternative plurals with d, (ii) there are numerous relations like hʌ̃nd > héndəɣ — *handy*, (iii) the words are members of a different class (SHH) from the t-counterparts, (iv) the orthography, for once, has 'd'.

We have also found a few rather more obscure SHH examples that should perhaps be analysed, analogically for historical reasons, as having -Nb and -Ng. First four examples with a velar ending, traditionally spelled 'rink', 'krink', 'sprunk' and 'gank': rĩŋg - ríŋ- ríŋgskə — *ring*, krĩŋg - kríŋ- kríŋgskə — *circle*, sprʏ̃ŋg - sprʏ́ŋ- sprʏ́ŋgskə — *jump, springing*, ɣʌ̃ŋg - ɣέŋ- ɣéŋgskə — *gait, going*. On the same grounds, one would be inclined to analyse verbs like zĩŋə, discussed in the previous section, as zĩŋgə, were it not for the fact that, as will appear, that creates more problems than it would solve.

The following examples seem to fall between two stools: dĩŋg - dĩŋər - díngskə — *thing*, pɔ̃nd - pɔ̃ndə - pʏ́ndsjə — *pound*, stʌ̃nd - stʌ̃ndə - stέndsjə — *stand, posture*.

Finally, two words (no more, unfortunately), usually spelled 'kamp' and 'kramp', which we would analyse as follows: kʌ̃mb - kέm - kέmbkə — *comb*, krʌ̃mb - krέm - krέmbkə — *cramp*. One can offer various arguments against our analysis in terms of 'underlying' /b. d. g/ rather than 'surface' /p. t. k/. For one thing, /g/ has long disappeared from most Netherlandish dialects, and almost from Mestreechs. The point of our argument is, however, that the division of the nouns concerned into the S and SHH classes is not completely random or lexically determined but is based on some kind of underlying linguistic or psychological 'logic' or regularity.

There remain a very small group of H nouns, vis. ɣʏ́ns - ɣʏ́nstə — *favour*, wins - winstə — *profit*, vʌ́ŋs - vʌ́ŋstə — *catch*, mins - minsə — *person, people*. The first three are distinguished by having -t- in the plural (which has disappeared from the singular). But this 'rule' is broken by one item, vis. kʏ̃ns - kʏ̃nstə — *art, artful tricks*, which has S. Our guess would be that the singular form, meaning 'Art', has become predominant, losing contact, so to speak with the plural t-form. That would suggest that frequency of occurrence and specialised word-meaning can have an impact on phonological organisation as a whole, disturbing otherwise regular patterns. If such processes continue for long enough, phonologically or grammatically determined distributions may ultimately become lexically determined or 'random'.

The mins - minsə example is historically understandable, deriving from something like *mínsk - mínskə; cf. prīns - prīnsə — *prince*. But the present-day learner of the language has of course no way of knowing that. To him or her it is a lexical exception, which can only survive, i.e. be remembered, again because of the frequency of occurrence.

4.2.2 A-adjectives with stem ending in -NC.

Although there are fewer items, one can observe similar patterns as in the equivalent nouns. However, there is no H class. We found about 20 adjectives taking S in all their forms, all ending in N+voiceless plosive, such as stɔ̄mp - stɔ̄mpə - stɔ̄mpər - stɔ̄mpstə — *blunt*. These are offset by five SHH examples, traditionally spelt 'rond', 'blind', 'gezond', 'kromp', 'jonk', and meaning *round, blind, healthy, crooked, young,* respectively. Again, it seems reasonable to analyse these as ending in -nd, -mb, and -ŋg, thus: rɔ̃nd - rɔ̑n - rɔ̑nə - rɔ̑nər

- rᴖ́nstə — *round*, krᴖ̄mb - krᴖ́m - krᴖ́mə - krᴖ́mər — krᴖ́mstə — *crooked*, jᴖ̄ŋg - jᴖ́ŋ- jᴖ́ŋə - jᴖ́ŋər - jᴖ́ŋstə — *young*.

4.2.3 A-verbs with stem ending in -NC.

Virtually all verb-stems ending in -NC have S in all their forms, e.g. bīndə - bɔ̄nd - bɔ̄ndə - ɣəbɔ̄ndə - də bīnds — *to bind*, drīŋkə - drᴖ̄ŋk - drᴖ̄ŋkə - ɣədrᴖ̄ŋkə - də drīŋks — *to drink*, stʌ̄mpə - stʌ̄mpdə — ɣəstʌ̄mp - də stʌ̄mps — *to stamp*. So this time we should be on the look-out for H forms. The only ones found, so far, are in some forms of the irregular verb vīndə - vᴖ̄nt - vᴖ̄ntə - ɣəvᴖ̄ndə - ix vín - də víns - her vínt - ver vīndə - ɣer vínt - zə vīndə, for which there seems no simple explanation.

One feels inclined to include zīŋgə. sprīŋgə. brīŋgə. hāaŋgə. vāaŋgə in this group, to bring out the similarity between nouns, verbs and adjectives having a voiced consonant after the nasal. However, that would result in more exceptions in the present tense sg. 1,2,3 and pl. 2, ix zíŋ. də víŋs. her híŋk. ɣer bríŋk, etc., taking us from the frying-pan into the fire. It would seem more realistic, if less 'elegant', to analyse these words as zīŋə. sprīŋə. brīŋə. hāaŋə. vāaŋə, and simply list them as exceptions to the rule that A+nasal takes H.

4.3 A-words with medial nasal sets.

4.3.1 A-nouns with medial -NC-.

Having dealt with end-positions of nasal sets after A-vowels, it remains to inspect medial sets. There are two types: -N- as in Ýmər - *bucket*, in which the first syllable may be regarded as open, and -NC- as in sīmpəl — *simple*. We will begin with the latter type, which offer the more complicated picture. Both types may be monomorphemic or polymorphemic with the morpheme-boundary coming after the nasal or after the C. The vast majority of forms with -NC- take S. Our problem is therefore to find out which take H.

As for nouns, we have seen that most plurals and diminutives with medial nasal sets keep the S of the stem, as in **lʌ̃mp** - **lʌ̃mpə** - **lɛ̃mpkə** — *lamp*. The small number of nouns in the SHH and H classes take H where applicable in such cases, e.g. **hʌ̃nd** - **hʌ́n** - **hɛ́ndsjə** — *hand*, **vʌ́ŋs** - **vʌ́ŋstə** - **vɛ́ŋskə** — *catch*.

Of some 20 monomorphemic nouns with medial -NC- in our data, nearly all take S , e.g. **wĩntər** — *winter*, **stɛ̃mpəl** — *stamp*, **wĩŋkəl** — *shop*, **zwĩndəl** — *swindle*, **vĩnstər** — *window*. Again it is the H cases, of which we found three, that must be separately accounted for. One is **pɪ́ŋkər**, i.e. a short piece of wood pointed at both ends used in the game of **pɪ́ŋkərə** — *tip-cat*. Perhaps the H is meant to be phonaesthetic, i.e. onomatopoeic. The other two examples are **rʏ́ndə** — *round (of drinks, etc.)*, **rʏ́ndɪŋ** — *rounding, curvature*. The logic of this would seem to be that the words are related to (the H form of) the SHH adjective **rɔ̃nd**. So far, no other cases of this kind have turned up, so we can only tentatively suggest a 'rule' like this: nouns take H if they are related to or derived from H or SHH words.

4.3.2 A-adjectives with medial -NC-.

All 'unrelated' monomorphemes found take S, as we would expect by now, e.g. **sĩmpəl** — *simple*, **dɔ̃ŋkəl** — *dark*, **ɔrdɛ̃ntələk** — *decent*. But there are far more such adjectives with a nominal, adjectival or verbal root or connection. Again S may be said to be the unmarked prosody, but quite a few take H for reasons which we have not been able, so far, to work out completely. As with nouns, it seems that H can often be ascribed to an association with another H or SHH word, e.g. **mɪ́nsələk** — *human*, cf. **mɪ́ns** — *person, human*, **hɛ́ndəɣ** — *handy*, **hʌ̃nd** - **hʌ́n** - **hɛ́nəkə** — *hand*. But this does not explain a few remaining cases like **ɣrɔ́ndəɣ** — *thorough*, related to the S-word ɣrɔ̄nd — *ground.*

4.3.3

A-verbs with medial -NC- are rather small in number, being restricted to structures such as kʌ̄ŋkərə — *to grumble*, hīŋkələ — *to do hopscotch*, ɛ̄nsələ — *to moan, quarrel.* They all take S.

4.3.4 A-words with medial nasal.

As for all open A-syllables, the unmarked prosody is H. Examples, nouns: pʏ́məl — *yokel*, ʏ́mər — *bucket*, kínəs — *acquaintance*, stɛ́ŋəl — *stem*, mʌ́ŋəl — *mangle*; verbs: zwɛ́ŋələ — *to swingle, turn*, hɛ́ŋələ — *to angle, fish*; adjectives: zwʌ́ŋər — *pregnant*, íŋəls — *English.*

However, we have found quite a few nouns and associated verbs with S, most of them with medial -ŋ-, but also one or two with medial -m-. They are hʏ̄mə — *shirt, vest*, lʏ̄məl — *lout, loafer*, īŋəl - īŋəls — *angel(s)* (cf. íŋəls — *English*), hīŋəl — *fishing rod*, zwīŋəl — *pump-handle*, slīŋər — *sling, pendulum*, vīŋər — *finger*, hɔ̄ŋər — *hunger*, ʌ̄ŋəl — *sting, barb*, and the associated verbs lʏ̄mələ — *to loaf about*, hīŋələ — *to angle, fish*, slīŋərə — *to sling, fling, meander*, vīŋərə — *to finger*, vərhɔ̄ŋərə — *to starve.*

It is clear that these are of the same type as zīŋə — *to sing*, sprīŋə — *to spring, jump*, brīŋə — *to bring*, hʌ̄ŋə or hāaŋə — *to hang*, vʌ̄ŋə or vāaŋə — *to catch*, and nȲmə — *to take*, which we encountered previously. Historically, these words had -ŋg-, if not always -mb-. But it appears again that there is little point in postulating -ŋg-, -mb- on the synchronic level. Indeed, the latter is out of the question as it would seem to obscure the phonetic difference between *hȲmbə — *shirt* and sɔ̄mbər — *sombre.* The -ŋg- sequence could be used without creating any such confusion, but as before we must recognise that such an analysis would only serve to shift the problem. The learner of the language would then have to remember which lexical items take -ŋg-, the only marker of which is indeed the S prosody. He or she might as well remember which items take the S prosody.

4.4 Some notes on A-words with l-sets.

4.4.1 A-words with -l.

The distribution of H and S in these words is of the same complexity as in those with nasals after the vowel. We only note some salient points.

There were 7 SHH nouns in -əl, prə̄l - prə́lə - prə́lkə — *rubbishy thing*, pə̄l — *vase*, knə̄l — *bloke*, lə̄l — *prick, cock*, nə̄l — *nought, twerp*, kə̄l — *nonsense*, smə̄l — *(on a) binge* < smə́lə — *to guzzle.* Interestingly, all these nouns seem to have some negative phonaesthetic quality, rather like the sl- words in English. In a few other cases we have observed that the prosodies S and H may themselves have a phonaesthetic function as well, e.g. in the interjection jə zȲstər — *my foot!*, < the regular zÝstər — *sister.*

Of the remaining A+l nouns, 20 take H and 9 SHH. Of the latter, at least four appear to be verbal derivatives like smə̄l. There are stə̄l — *set*, vərsjə́l — *difference*, vʌ̄l — *fall*, rɔ̄l — *(on the) roll*. However, this may not be a general phenomenon, as we have found at least one such word in the H class, viz. tə́l — *(to lose) count* < tə́lə — *to count*.

Among adjectives ending in -l we found 9 with SHH, such as hɛ̄l - hɛ́l - hɛ́lə — *tough*, and 3 with H, such as stə́l — *quiet*.

All verb forms with stem ending in -l take H.

4.4.2

A-words with stems ending in -l(ə)C, like their counterparts with nasals, mostly take S, e.g. stɛ̄lt — *stilt*, zʌ̄ləm — *salmon*, vʌ̄ls — *false, mean*, hɛ̄ləpə — *help*. But there are quite a few taking H, mostly, it would seem, as a result of confusing forms with original and epenthetic -ə-, thus ɣəzə́ləɣ — *sociable, pleasant*, zʌ́ləvə — *to anoint*. The H class seems to vary to a considerable extent from speaker to speaker. If a speaker finds a word unfamiliar, technical or modern, he or she is more likely to give it an H prosody, corresponding to the pronunciation in standard Dutch. Examples: ə brútsjə zʌ́ləm — *a salmon sandwich*, fə́ləm — *movie*, vɛ́ləɣ — *wheel, rim*, wʌ́ləɣ — *distaste*, zʌ́ləv — *ointment*.

Most words with l-sets in medial positions take H, thus zɔ́ldər — *attic*, hɛ́ldər — *clear*, bə́ldərə — *to roar*. A number of rather old-fashioned noun forms with svarabhakti take S, e.g. zə̄ləvər — *silver*, sɔ̄ləvər — *sulphur*, mɛ̄ləɣər — *marl, lime*.

4.5 Some notes on A-words with *r*-sets.

4.5.1

With a few minor exceptions, all A-words with stems ending in -r(C) take H. There are no SHH or S classes as with nasals or l-sets. Examples: lɔ́r — *rag, trash*, sjɔ́rs — *bark of tree*, dɔ́r — *barren*, zwʌ́rt — *black*, kírə — *to coo*, kɔ́rtə — *to shorten*. The exceptions are English loans like bʌ̃r — *bar* and onomatopes like blɛ̄rə — *to bleat, bawl*, sjɵ̄rə — *to tear, to tear along*. Words with medial -rC-, like their counterparts with nasal or lateral, take H as a rule, thus: hɛ́rtəɣ — *duke*, slɔ́rsəɣ — *messy*.

4.5.2

In words with svarabhakti sets in stem-final position the situation is more complex. Out of a total of approximately 30 such nouns in our data, about 10 belong to the SHH class, including all or most of those ending in -ɛrəm, -ɵrəm and some ending in -ɛrəɣ, viz. ɛ̄rəm - ɛ́rəm - ɛ́rəmkə — *arm*, dɛ̄rəm - dɛ́rəm — *bowel(s)*, vɵ̄rəm - vɵ́rəm — *form*, wɵ̄rəm - wɵ́rəm — *worm*, stɵ̄rəm - stɵ́rəm — *storm*, dwɛ̄rəɣ - dwɛ́rəɣ — *dwarf*, bɛ̄rəɣ - bɛ́rəɣ — *hill, mountain*, bɛ̄rəm - bɛ́rəmə — *verge*, zwɛ̄rəm - zwɛ́rəmə — *swarm*, sjɛ̄rəm - sjɛ́rəmə — *shield, shade*. These two sub-classes are quite unstable and tend to get mixed up. Also, the unfamiliar words tend to be taken out by less traditional speakers and treated as members of the larger S class. Indeed, nearly all other items in our data take S in singular and plural, e.g. pʌ̃rək — *park*, kə̄rək — *church*, slɵ̄rəv — *trunk, nozzle*, dɵ̄rəp — *village*. The only example with H found so far is bʏ́rəx - bʏ́rəxtə — *borough, citadel*.

The three adjectives belonging to the SHH class have similar endings to the equivalent nouns. They are: ɛ̄rəm — *poor*, wɛ̄rəm — *warm*, ɛ̄rəɣ — *bad*. But fɛ́rəm — *firm, plucky* has H, possible because it is felt as non-native. Most other adjectives ending in -rəC take S, unless derived from H forms, e.g. sjɛ̄rəp — *sharp*, stɛ̄rək — *stark, strong*.

With verbs too, the most complex group is that ending in -rəC. The majority of these take S, some H and a few take SHH. The latter group consists of half a dozen strong verbs declined as follows: stɛ̄rəvə - stɔ́rəv - stɔ́rəvə - ɣəstɔ̄rəvə - də stérəfs — *to die (cf. starve)*. Similarly ɛ̄rəvə — *to inherit*, zwɛ̄rəvə — *to wander*, bədɛ̄rəvə — *to spoil, decay*, vərbɛ̄rəɣə — *to hide*.

The (unmarked) S class includes for instance wɛ̄rəkə — *to work*, hʌ̄rəkə — *to rake*, slērəpə — *to slurp*.

Verbs derived from the SHH (as well as H) nouns and adjectives appear to take the H form as their base: stérəmə — *to storm, blow*, vērəmə — *to form*, wɛ́rəmə — *to warm*, vərɛ́rəmə — *to impoverish*. The verbs sjʌ́rələ — *to court, potter around*, dwʌ́rələ — *to flutter, whirl*, kɛ́rəmə — *to groan* are perhaps felt as unfamiliar or literary.

The last one in this list, **dérəvə** — *to dare*, with preterite **dɔ́rəv** or **dérəvdə** may be regarded as an irregular verb.

4.5.3

We have not found any verb stems with r-sets in medial positions. In monomorphemic A-nouns with medial r-sets we find similar patterns as in those with l-sets. Those with svarabhakti, some of them indeed alternative forms of the examples given under l-sets, generally take S prosody, e.g. **mɛ̄rəɣəl** — *marl, lime*, **ɛ̄rəɣəl** — *organ*, **sjɛ̄rəvəl** — *sliver, potsherd*, **vɛ̄rəkə** — *pig*.

As always, this tendency may be overruled if a word is unfamiliar or derived. Another interfering factor is that open syllables before -r, although rare, take H, e.g. in **hɛ́rənsə** — *kind of cheese*, **hɛ́ri** — *noise, racket*. These various factors or a mixture of them may perhaps partially account for the following unexpected cases: **mɛ̄rət** — *market*, **bɛ̄ri** — *stretcher*, **ɛ́rəns** — *seriausness*, **spɛ́rəvər** — *sparrow-hawk*, **hɛ́rəfs** — *autumn*, **bérəɣər** — *burgher, citizen*.

In A-nouns with medial r-sets without svarabhakti, H is again the rule, barring derivations, etc., thus: **wɔ́rtəl** — *root, carrot*, **hɛ́rtəɣ** — *duke*, **hɛ́rsəs** — *brain(s)*.

These few adjectives with r-sets in medial position appear to follow the same pattern as equivalent nouns, thus **wə̄rəkələk** — *real, true*, **slɔrsəɣ** — *messy*, **érənstəɣ** — *serious*, **ɛ́rəns** — *seriousness*.

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PROFESSOR JACK CARNOCHAN: BIOGRAPHICAL NOTE

Jack Carnochan was born in Dartmouth, Devon, on 6 March 1918. In 1936 he entered University College London with an Open Scholarship and was awarded a Certificate in the Phonetics of French in 1938 and an Honours BA in French in 1939. He later went to Cambridge University where he obtained a Diploma in Education in 1943.

He joined the School of Oriental and African Studies (SOAS) at the University of London in 1943 as Temporary Lecturer in the Department of Phonetics and Linguistics (a ten week appointment at a fee of £75), and assisted with courses in Japanese for service personnel going to the Far East. Later that year the post was converted to an Assistant Lectureship; and in 1945 he was appointed Lecturer in Phonetics. In 1948-49 he made his first research trip to northern Nigeria to work primarily on the phonetics and phonology of Hausa, but also on Fulani and Tiv. It was at this time that he collected the material that was to form the basis for his pioneering studies of Hausa phonology (1951, 1952). In 1963 he returned to Nigeria to work on another Chadic language, Bachama.

In 1956 Jack Carnochan was appointed Senior Lecturer in Phonetics at SOAS, then Reader in Phonetics in the University of London in 1964, and Professor of Phonetics in 1972. In 1982, the year of his retirement, he received the title of Emeritus Professor in the University of London.

During the earlier part of his career he worked closely with Professor J. R. Firth and other colleagues on the development of a distinctive type of phonological theory, prosodic analysis; in connection with this he taught courses in phonetic and phonological theory and methodology at both undergraduate and postgraduate level. His other main teaching and research interests lay in experimental phonetics and the phonetics and phonology of a range of West African languages. He taught specialist classes on Hausa, Bachama, Fulani, Yoruba, Igbo and Efik, as well as courses on English for African Students. Arabic and Swahili also came within his remit at various times.

There was a constant demand for his expertise at institutions overseas. He taught English phonetics under the auspices of the British Council in France, Norway, Denmark, Poland, Israel and India. In 1962 he was invited to the Phonetics Department of the Czechoslovak Academy of Sciences, and in 1968 he was again in Prague as guest of the Phonetics Department of the Charles University. He made advisory visits in a professional capacity to Al-Azhar University, Cairo, the Nigerian Federal Ministry of Education, the University of Jiddah, the Linguistics Institute in Damascus and the University of Tunis: and he served as External Examiner to the Universities of Leeds, York and Ibadan and to the College of Speech Therapists. He was appointed a member of the Council of the Philological Society in 1971 and was from 1968 to 1971 Chairman of the Linguistics Association of Great Britain.

Within the School itself he had a multitude of commitments, serving on the Academic Board for over thirty years and acting as Advisor to Men Students for twenty. From 1977 to 1981 he was Acting Head of the Department of Africa.

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